

Sherburne
National
Wildlife
Refuge



1971

NARRATIVE REPORT

for

1971

SHERBURNE NATIONAL WILDLIFE REFUGE

Princeton, Minnesota

1971 PERSONNEL ROSTER

SHERBURNE NATIONAL WILDLIFE REFUGE

Permanent Personnel

Robert G. Yoder, Refuge Manager, GS-12	1/1/71	to	12/30/71
E. Homer McCollum, Soil Conservationist, GS-9	1/1/71	to	12/30/71
Robert L. Drieslein, Ass't Refuge Mgr., GS-7	1/1/71	to	12/30/71
Karen A. Smith, Public Use Specialist, GS-7	5/16/71	to	12/30/71
Patricia A. Dunham, Clerk-Typist, GS-5	1/1/71	to	12/30/71
Wesley C. Thompson, Maintenceman, WG-9	1/1/71	to	12/30/71
Merlin A. Wicktor, Engnrg. Equipmt. Operator, WG-8	6/27/71	to	12/30/71
Reuben A. Mathison, Maintenceman, WG-5	1/1/71	to	12/30/71
Henry W. Trebesch, Maintenceman, WG-5	1/1/71	to	12/30/71

Temporary Personnel

John W. Moore, Botanist, GS-11	7/15/71	to	10/18/71
Kerry A. Parcel, Biological Aid, GS-4	6/14/71	to	9/30/71
Wayne L. Harper, Laborer, WG-2	5/15/71	to	10/29/71
Ronald A. Johanson, Student Aid, YW	1/20/71	to	10/29/71
David D. Goetz, Student Aid, YW	1/20/71	to	8/27/71
Orville J. Johnson, Laborer, WG-2	5/3/71	to	10/29/71
Gordon W. Wold, Laborer, WG-2	5/3/71	to	10/29/71
Thomas Goeritz, Student Intern	6/15/71	to	9/6/71
Mark Stultz, Student Intern	6/15/71	to	9/6/71

C O N T E N T S

NARRATIVE REPORT	Page
I. GENERAL	
A. Weather Conditions	1
B. Habitat Conditions	2
II. WILDLIFE	
A. Migratory Birds	3
B. Upland Game Birds	6
C. Big Game Animals	7
D. Fur Animals, Predators, Rodents and other Animals	8
E. Hawks, Eagles, Owls and Crows	9
F. Other Birds	12
G. Fish	14
H. Reptiles	15
I. Diseases	15
III. Refuge DEVELOPMENT AND MAINTENANCE	
A. Physical Development	15
B. Plantings	17
C. Collection and Receipts	19
D. Control of Vegetation	19
E. Planned Burning	19
F. Fire	21
IV. RESOURCE MANAGEMENT	
A. Grazing	21
B. Haying	21
C. Fur Harvest	22
D. Timber Removal	22
V. FIELD INVESTIGATION OR APPLIED RESEARCH	
A. Progress Report-Goose Flock	22
B. Sedge Productivity Study	25
C. Refuge Herbarium	32
D. Proposed Natural Area	33
E. Indian Mound Excavations	37
VI. PUBLIC RELATIONS	
A. Recreational Uses	45
B. Environmental Education	49
C. Refuge Visitors	50
D. Refuge Participation	51
E. Hunting	51
F. Violations	52
G. SAFETY	53
VII. OTHER ITEMS	
A. Items of Interest	55
B. Signature	58

NR Forms Appended

SHERBURNE NATIONAL WILDLIFE REFUGE

Princeton, Minnesota

NARRATIVE REPORT

Calendar Year 1971

I. General

A. Weather Conditions - 1971

TABLE I

	Precipitation			Temperature	
	Snowfall*	This Month**	Normal***	Maximum**	Minimum**
January	13.1"	1.61	.90	34	-22
February	21.6	2.24	.90	48	-29
March	4.3	.45	1.50	50	-12
April	4.4	2.18	2.00	74	10
May	3.2	2.52	3.70	79	30
June	0	3.86	4.50	90	43
July	0	3.40	3.30	89	44
August	0	3.39	3.70	96	38
September	0	2.47	2.40	90	28
October	0.5	6.79	2.00	80	24
November	8.9	3.05	1.50	57	2
December	<u>6.6</u>	<u>.77</u>	<u>.80</u>	<u>36</u>	<u>-14</u>

Annual

Totals: 62.6" 32.73 27.20 96 -29

Extremes:

*Data obtained from U.S. Weather Bureau Office in St. Cloud, Minnesota.

**Data obtained from official weather station maintained by Gordon Wold of rural Santiago, $\frac{1}{2}$ mile north of the Refuge.

***Data obtained from Milaca, Minnesota weather station located 15 miles north of the Refuge.

The overall weather picture for 1971 could be summed up as moderate. However, even a moderate year has enough extremes in temperature and precipitation to remain the number one topic of conversation.

One notable observation was that, by year's end, no severe storms had occurred in this area during either the winter or summer months.

January proved to be unexcessive both in snowfall and temperatures. Although the temperature dropped to a minus figure during the night hours most of the month, there were only 2 days when daytime temperatures were not above the 0° mark. By the time February had passed, we had accumulated another two feet of snow.

Early spring was dry and cool, with our first heavy rains occurring in mid to late May. June and July brought scattered rains and relatively cool weather.

August, traditionally a dry month, was no exception this year. Although the total rainfall for the month was near normal, over 2½" of that fell in two days towards the end of the month.

September was damp and drizzly, but temperatures stayed in the temperate zone. October temperatures remained mild for most of the month, but any moisture we might have missed during the spring and summer finally arrived. By the end of the month, the total accumulation had exceeded, by almost three times, the normal for the month. Ground water levels reached the saturation point and the rivers and ponds equalled the spring high water.

The remainder of the year reverted back to the uneventful and the weather year again ended on the mild side.

B. Habitat Conditions

1. Water Spring run-off was slow again this year, with little flooding. Relatively little rainfall during April and May resulted in low water levels throughout the refuge. June rains eased the situation somewhat, but overall water conditions were less than ideal.

2. Food and Cover No great change has occurred in these categories during the past year. Available agricultural food production remains more than adequate to meet existing needs.

We had a fairly good wild rice crop this year, which was heavily utilized by waterfowl early in the season. However, raising the water level in Buck Lake by closing the outlet, resulted in eliminating wild rice from that area.

The majority of the ducks using the Refuge this fall fed off the refuge, utilizing wild rice on Little Rice Lake, a state managed area to the north, flying over refuge corn to get there. This, I think, points out something most of us are aware of but may tend to forget. Given an adequate food supply, both on dry land and flooded, birds will utilize the flooded area until the food is gone or freeze up comes. Developing a workable moist soil crop program at Sherburne may be one of our most important waterfowl management tools. After freeze up, isn't it time Minnesota birds were heading south? We did have some ducks feeding in cornfields late in the season. The first we have observed in this area. Again, this was off the refuge, in an area of large open fields and again the birds flew over refuge corn to get to this area.

Much of the time spent by our small flock of migrant geese was off the refuge - on a 40 acre field, half of which was oat stubble with ripe foxtail grass and green volunteer oats. The other half was close cropped pasture.

The refuge farming program is set up on a strip crop system, with narrow 15-20 rod strips of corn, rye and clover. This is a very valid agricultural procedure, in fact, a necessity to reduce wind erosion.

Question: what is the relative attractiveness of a large strip cropped field compared to a large single crop field? In order for birds to utilize the food, you have to have birds, and we don't have many. But it does seem we are observing some preferences.

Good waterfowl nesting cover is still in short supply. Some of the earlier native grass and D.N.C. seedings should provide cover in 1972, but this acreage is quite small.

Deer and grouse cover is above average for this area. The refuge share of corn is largely being taken by deer during the winter.

II. WILDLIFE

A. Migratory Birds

1. Swans Whistling swans migrated through the refuge during the second week in April. A peak of 190 birds was recorded on April 6. Total use-days for the year were 441, an increase over 1970.

2. Ducks Mallards and common goldeneyes wintered along the Mississippi River 8 miles to the south and a few mallards were seen on the refuge during warm spells when portions of the St. Francis River opened up. A group of four mallards on March 30 were the first spring

migrants. Mallards, pintails and other dabblers moved into flooded millet and peaked at about 7,000 birds by mid-April. On April 11 an estimated 12,000 scaup showed up on Rice Lake following the ice break-up. By the next day, all but a few hundred had pulled out. Our spring peak for all ducks was an estimated 20, 300 birds. Canvasbacks made an appearance this spring in some numbers. A flock of about 100 was observed April 13 on Rice Lake and small courting parties stayed on Orrock Lake and Johnson Slough for a few weeks. At least one pair of "cans" staked a claim and raised a brood of seven on Buck Lake. This was our first known canvasback production since the refuge was established.

Duck production was up slightly from last year with an estimated 603 young recorded. Blue-winged teal, mallards, wood ducks, and ring-necked ducks are the common nesting species in that order. Green-winged teal, shovelers, and canvasbacks were also recorded nesting this summer. In general, duck production has been rather disappointing at Sherburne to date. Most marshes and lakes are characterized by dense cattail borders which persist with the low muskrat population. Exposed mudflats and other areas where breeding pairs can loaf and preen are virtually non-existent and brood movements through the cattail mats are restricted. Heavy hunting pressure on local breeders may also be a factor. With our first "managed" waterfowl hunt and a closed season on muskrat trapping this fall, we hope to see some improvement within the next few years. At any rate, Sherburne will not function as a duck factory without future development.

Wood duck nest boxes were checked and renovated again this summer and use by woodies is running less than 10%. Apparently, there are other factors limiting wood duck production in addition to, or instead of, nesting cavities. At this point we are in agreement that further expansion of the wood duck nesting box program without some further intensive study is questionable.

During the middle of August, blue-winged teal and wood ducks began moving into Orrock Lake and Johnson Slough. The coots were not far behind and by the first of September the wild rice began to ripen. From then on it became a race to see who could eat the most rice in the least time. The coots won through sheer numbers - about 15,000 on September 20. As discussed later, most of the larger lakes and marshes in the refuge were closed to duck hunting during the fall 1971 season. As expected, a dramatic increase in fall waterfowl use resulted. The fall distribution of ducks could generally be grouped into three areas on the refuge. The first group, composed mainly of ring-necks, some mallards and few gadwalls, frequented Orrock Lake, Johnson and Durgin Slough and numbered 1,000 to 1500 birds. The second group, 4-600 wood ducks stayed in an area flooded by beaver in the northeast corner of the refuge. The third group, about 5,000

birds, composed of 90% mallards and the rest baldpates and green-winged teal stayed on the north end of Rice Lake. The last two groups of birds usually left the refuge just after sunset to feed on Little Rice Lake west of Princeton. Long Pond, which supported most refuge ducks last year during hunting season received only limited use in 1971. Fall use days for ducks were more than double those of 1971.

3. Geese Our first Canada geese arrived this year on April 1 with a peak of 250 on April 11. A flock composed of 17 snows and blues and one white-fronted goose arrived in mid-April and stayed with our captive flock for about 6 weeks. Fall migrant Canadas began moving through in small flocks in early September. With a closed goose season in the refuge this fall, geese hung around longer and flocks feeding in fields were a common sight. One group of about 80 Canadas stayed on Rice Lake for about 6 weeks feeding in adjacent fields. Several large flocks of snow and blue geese migrated through the area during the first week in October. A total of 10,845 goose use days were recorded for a five-fold increase over last year.

The following table summarizes the duck, goose and coot use-days on the refuge since 1965:

TABLE II

Year	Ducks	Geese	Coots
1966	174,670	840	104,405
1967	181,196	1,611	105,756
1968	335,181	5,684	195,510
1969	528,246	4,039	463,645
1970	438,274	2,161	611,005
1971	637,753	10,845	396, 621

A progress report on the captive goose flock and the first release of Giant Canadas will be discussed in Part V.

4. Other Marsh Birds Two pairs of common loons nested on the refuge this year and raised a total of three young. Sandhill crane sightings were limited to two birds on August 2. Coots were present this spring in limited numbers and an adult with two chicks was seen on Johnson Slough in July. Coot numbers were down probably due in part to a decrease in the amount of wild rice available. The calls of soras and American bitterns were familiar sounds around Sherburnes' marshes in spring. Virginia rails were seen occasionally and a black rail observed near Rice Lake in late September was a "first" for the refuge. Two great blue herons were collected as directed for pesticide analysis.

5. Dove The mourning dove trapping and banding study in cooperation with the Minnesota Department of Natural Resources was repeated again this summer. A total of 234 birds were captured from June 15 to August 15. Returns from doves banded in previous years showed that some of our birds are wintering in northern Mexico, although most reports come from Louisiana and Texas.



B. Upland Game Birds

Ring-necked pheasants continue to be scarce, but are holding their own. Ruffed grouse numbers were high again this year. Hunters found plenty of birds in the coverts, however, getting them into the bag usually proved to be another matter. In spite of very heavy hunting pressure, winter flocks of 4 to 10 birds were commonly seen feeding on aspen buds in late afternoon. Hazel catkins, buds of willow and seeds of sumac and other plants were also taken in winter. Plantations of medium-aged jack pine, red pine and spruce were used heavily by roosting grouse, particularly in early winter when snow conditions were not conducive to burrow roosting. Three sample plots in male aspen clones were set

up in cooperation with personnel of the Forest Experiment Station near Cloquet, Minnesota. A long-term study of the production of male aspen buds on these plots will be made as part of a general survey in Minnesota's main grouse range. A drastic decline in the male aspen bud crop in northern Minnesota is expected to cause a decrease in winter carry-over of ruffed grouse. As yet, no such decline in bud production has been noted on the Refuge.

C. Big-Game Animals

From what information we have, our deer population seems to be doing well and relatively unchanged in numbers from last year. We flew the refuge with John Winship on February 12, 1971 and counted 98 animals. Deer were scattered in small groups and we probably observed less than half of the total herd. The refuge population is estimated at between 250 and 300 animals. Early in the winter before the snow piled up, deer made heavy use of refuge corn and were scattered in small groups. By mid-February they began bunching in three or four hardwood swamps and the diet shifted largely from corn to browse. Deer made very little use of Christmas tree plantations during the winter months. By the first of March we had heavy crust conditions and began having dog problems. Several incidents of dogs chasing deer on and near the refuge were reported. Heavy deer mortality did occur off the refuge when several dogs got into a winter yard, but our observations indicated that some crippling and harassment occurred in the refuge. At first glance the dog problem appears to be minor since there is little direct mortality of deer. However, the stress of deer being harassed and chased out of their yards when the snow is deep and crusted may be significant and appears worthy of further study.



Three deer were struck and killed by cars last winter. We erected the sign pictured below in an attempt to slow traffic along County Road # 5, the main highway bisecting the refuge.



D. Fur Animals, Predators, Rodents and Other Animals

1. Muskrat Numbers of muskrat remain relatively unchanged from last year. Heavy trapping over the last several years may be keeping 'rat numbers down. With a closure of the trapping season this fall, we hope to see more muskrats in the marshes next year.

2. Mink and Beaver Mink sign was seen less frequently this year during the muskrat house count. The closed season on beavers this fall should allow these animals to increase and pioneer new areas on the refuge.

3. Raccoon, Striped Skunk and Fox All these animals are common in this area. Red foxes were seen quite often this summer as the pups left the dens and began dispersing throughout the refuge.



4. Rabbits Snowshoes seem to be increasing and cottontails are as rare as hen's teeth. Jackrabbits are very scarce as expected since we do not have much habitat for these animals.

5. Other Animals The star-nosed mole and arctic shrew were added to the refuge mammal list.

E. Hawks, Eagles, Owls and Crows

1. Hawks The following species of hawks were seen on the refuge this year:

Sharp-shinned hawk	-	U	
Cooper's hawk	-	U	
Red-tailed hawk	-	R	M-Migrant
Red-shouldered hawk	-	U	R-Resident
Broad-winged hawk	-	R	U-Status undetermined
Rough-legged hawk	-	M	
Marsh hawk	-	U	
Peregrine falcon	-	U	
Pigeon hawk	-	M	
Sparrow hawk	-	R	
Osprey	-	M	

Redtails, broadwings and sparrow hawks nest commonly on the refuge and seem to be holding their own. Sharpshins, coopers, red-shoulders and marsh hawks are apparently in trouble. All four of these species were seen here during migration but we have no evidence of any nests or young. Christmas Bird Counts and other data show a steady decline in numbers of these birds throughout the U.S. Three peregrines and a pigeon hawk were observed - the latter was a new addition to our bird list. An osprey spent most of the month of September fishing on Bergerson Slough and Rice Lake. We hope he made it through the hunting season - several other raptors didn't. Hawks in general caught hell during the fall migration which unfortunately coincides with the grouse and early waterfowl season. The garage at the assistant manager's residence and a pen at the maintenance shop were converted into aid stations for wounded hawks. Four birds recovered and were released; another died, one was picked up dead and another crippled bird escaped capture. All of these birds were randomly discovered; there was no concerted effort to search for crippled hawks. It's not surprising that the anti-hunting sentiment is growing and the red book keeps getting thicker.

2. Eagles An adult golden eagle was observed and photographed on March 8, 1971. An encouraging influx of eagles into the refuge occurred this fall coincident with a closure of Rice and Orrock Lakes to waterfowl hunting. In the absence of hunting and other disturbance, as many as four immature bald eagles were observed roosting near Orrock Lake. A sizeable nesting population (75-100 breeding pairs) occurs in the Chippewa National Forest about 200 miles north of the refuge and it is conceivable that we may attract some nesting eagles in the future. Most of the eagles which migrated through the refuge this year were probably from that general area.

3. Owls The influx of short-eared owls last year was not repeated in 1971. Screech owls were seen or heard occasionally and one bold individual set up sleeping quarters in the pole barn at our maintenance shop. A long-eared owl nest was discovered on the refuge in June by Mr. Bill Hanson from Princeton, Minnesota. This was the first recorded nesting of this species on the refuge and one of a handful of nesting records for the state in a number of years. The nest was successful and three young owls were raised to flight stage. An early snowy showed up on November 17 perched on the observation tower at Rice Lake. Great Horned owls moved into the shop area and snatched a few goslings this summer. However, they didn't put us out of business so we returned the favor. The nest pictured in the following shot, produced one young owl on a diet totally exclusive of rabbits.

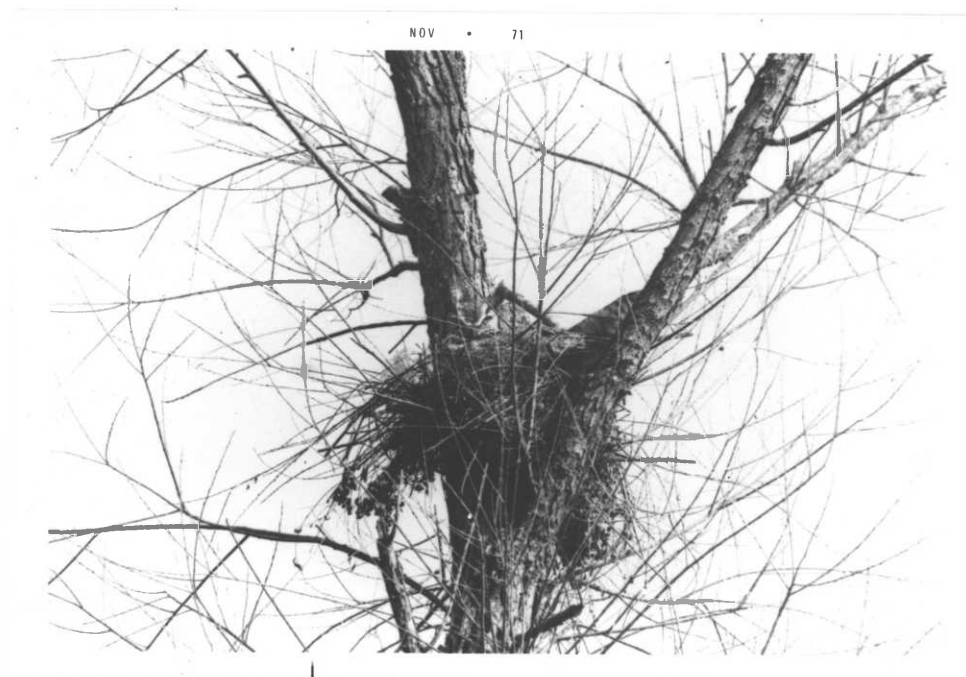


11.

This screech owl refused to wake up even to have his picture taken.



Young long-eared owls --- It has been suggested that this picture might also depict the refuge staff just after submission of the Refuge Program Schedule.



4. Crows Crows are permanent residents of the refuge.

F. Other Birds

Our bird list was revised again with the addition of the following species:

1. Pigeon hawk
2. Black rail
3. Upland plover
4. Solitary vireo
5. Parula warbler
6. Golden-winged warbler
7. Hoary redpoll
8. White-winged crossbill

A Christmas Bird Count was held December 19, 1971, at the refuge with 16 observers participating. A total of 1980 birds of 30 species were seen. It looks like this winter will be an interesting one for bird lovers in this area. Common and hoary redpolls, pine grosbeaks, purple finches, crossbills, bohemian waxwings and other winter birds have invaded southward for the first time in three or four years.



Swallows came through in large numbers last fall - not much elbow room here.

The following list of arrival dates were recorded for this year's spring migration:

3/8	Golden Eagle
3/10	Belted kingfisher
3/14	Sparrow hawk
3/14	Robin
3/16	Eastern meadowlark
3/21	Redtail hawk
3/25	Roughlegged hawk
3/25	Bald eagle
3/25	Mourning dove
3/25	Red-winged blackbird
3/28	Canada goose
3/29	Great Blue Heron
3/29	Killdeer
3/30	Mallard
3/30	Marsh Hawk
3/31	Black duck
3/31	Pintail
3/31	Coot
3/31	Eastern bluebird
4/1	Hooded merganser

4/1	Common grackle	4/30	Barn swallow
4/2	Eastern phoebe	5/2	Peregrine falcon
4/3	Fox sparrow	5/2	Brown thrasher
4/6	Whistling swan	5/3	Wilson's phalarope
4/6	Baldpate	5/5	Cliff swallow
4/6	Shoveler	5/5	Black & white warbler
4/6	Ring-necked duck	5/5	Clay-colored sparrow
4/6	Lesser scaup	5/7	sora
4/6	Red-breasted merganser	5/8	Green heron
4/6	Herring gull	5/8	Short-billed marsh wren
4/7	Green-winged teal	5/10	Chipping sparrow
4/7	Blue-winged teal	5/10	Catbird
4/7	Wood duck	5/11	Baltimore oriole
4/7	Common goldeneye	5/10	Palm warbler
4/7	Bufflehead	5/12	American bittern
4/7	Vesper sparrow	5/12	Whip-poor-will
4/8	Pied-billed grebe	5/12	Nashville warbler
4/8	Snow goose	5/12	Bobolink
4/8	Blue goose	5/12	Rose-breasted grosbeak
4/8	Canvasback	5/13	Spotted sandpiper
4/8	Common merganser	5/13	Wood thrush
4/9	Gadwall	5/13	Veery
4/9	Song sparrow	5/14	Lesser yellowlegs
4/11	Redhead	5/14	Eastern kingbird
4/11	Sandhill crane	5/14	Yellowthroat
4/11	Yellow-shafted flicker	5/15	Yellow-bellied sapsucker
4/11	Tree swallow	5/15	Cape may warbler
4/12	Common loon	5/15	Harris' sparrow
4/16	Common egret	5/15	Black tern
4/16	Black-crowned night heron	5/15	Tennessee warbler
4/18	Turkey vulture	5/17	Common nighthawk
4/20	White-fronted goose	5/17	American redstart
4/20	Ruddy duck	5/17	Lark sparrow
4/20	Yellow-headed blackbird	5/20	Crested flycatcher
4/21	Horned grebe	5/20	House wren
4/21	Ruby-crowned kinglet	5/20	Yellow warbler
4/21	Myrtle warbler	5/20	Blackpoll warbler
4/22	Brown-headed cowbird	5/20	ovenbird
4/22	Cardinal	5/21	Swainson's thrush
4/23	Swamp sparrow	5/25	Indigo bunting
4/24	Cooper's hawk	6/9	Least bittern
4/26	Greater yellowlegs	6/11	Upland plover
4/30	Broadwinged hawk	6/20	Ruby-throated hummingbird
4/30	Common tern		

G. Fish

Carp are still with us in great numbers and it looks like they won't go away. Opening weekend of fishing season produced some nice pike in the pool near the headquarters.

H. Reptiles

Nothing new to report.

I. Disease

Nothing to report.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

With five people in a small three room building, our office was starting to suffer from the population explosion. To combat this problem we constructed a 12 foot addition across the west end of the building, divided this into two, 10'X12' offices. For the time being at least, the housing problem is solved.

One and a half miles of fence was constructed along the north boundary.

One mile of fence was constructed as protection for a proposed natural area.

Approximately three miles of old fence was removed in the vicinity of the snowmobile trail.

Eight farm sites were cleaned up and dozed under, for a total of 101.

One additional Visitor Contact Point was established on the west side of the refuge, and an observation tower constructed on the south side of Rice Lake.

Preparation for hunting season involved $34\frac{1}{2}$ miles of posting, and developing 19 additional small parking areas.

We also constructed two short roads with parking areas for canoe access to the St. Francis River.

We tried blasting with AN/FO through the ice last winter, with reasonably good results. Working on a shallow cattail marsh which was frozen solid, we cut through about 14" of ice and 4" of frozen muck, setting the explosive about 4' below the surface of the ice. For potholes we set three 15 pound charges in a 6' triangle, and got a 30 foot diameter hole about 5' deep. We also set a string of twenty-five 10 pound charges on 4' centers. Result - a ditch 100 feet long, 10 feet wide and 4 feet deep. With the potholes, we obtained approximately 2' of edge and 15.5 square feet of surface per pound of explosive. On the ditches, .8 ft. of edge and 4 square feet of surface per pound.

• NOV • 71



Working on top of the ice was much easier than
working in 2 inches of mud and water.

-and the results
were good.



NOV • 71

New Equipment

Brand new equipment includes a Dodge pickup, two mobile radio units, and a 10 foot Kirschmann grain drill.

In the "new for us" category, we managed to obtain a 15-B Bucyrus-Erie dragline and a P&H truck crane from the Twin Cities Army Ammo Plant. Both in reasonably good condition.

Utilizing a little ingenuity, resourcefulness, surplus property and used equipment yards, we got our motor grader outfitted for snow plowing. Since the picture was taken, we've also rigged up a one-way plow - so let 'er snow!



B. Plantings

1. Aquatics and Marsh Plants None
2. Trees and Shrubs None

3. Upland Herbaceous Plants With a brand new, ten foot Kirschmann drill, we were all set to make big tracks with native grass seeding this year. It took less than thirty minutes in the field to discover that the drill wouldn't handle our seed, but it took nearly a week to admit it. Since this drill had been used successfully by the S.C.S. in North Dakota, there were a couple of phone calls and a quick trip to Bismarck. It turned out that the S.C.S. people have developed a method for cleaning this seed, which removes most of the fuzzy awns and all of the trash.

The cleaned seed runs from 80-95% purity, and bears very little resemblance to the rough material. This is the seed they use with the Kirschmann drill. I did see enough to convince me that using cleaned seed would eliminate about 90% of the problems we have getting the stuff in the ground.

There are tentative plans to set up our own seed cleaning operation, possibly on a region-wide basis.

We did manage to seed 93 acres of natives - with a Nesbit drill borrowed from Benson WMO. This brings our total to 406 acres. The first natives were seeded at Sherburne in 1967. Big bluestem, little bluestem, Indian grass and switch grass were seeded in 1967 and 1968. In 1969, 70 and 71, green needlegrass and blue gramma were added to the mixture.

In this area the first seed stalks appear the third year after planting. Indian grass seems to be easily the most aggressive, being the dominant species on all fields where it was used. Little bluestem and switch grass show up in about equal proportions, but much less than Indian grass. Big bluestem is present, but appears severely suppressed, showing only an occasional seed stalk. This is particularly interesting since the remnant native stands of big bluestem appear quite thrifty and have produced an abundance of seed the past three years. A notable exception to this is a field seeded in 1967 and burned in May 1971. Details are covered in the section on controlled burning.

We have not as yet been able to find green needlegrass or blue gramma in the 1969 or later seedings.

We did use the new drill to good advantage with D.N.C. seeding. Refuge personnel seeded 115 acres to a mixture of tall and slender wheatgrass, sweetclover and alfalfa. Two permittees farmers seeded an additional 42 acres to this same mixture.

4. Cultivated Crops Ten farmers were issued Special Use Permits covering 1,624 acres of farm lands. Farming operations were completed on 1,510 acres.

Corn	- 716 acres	Red clover	- 147 acres
Harvested rye	- 298 acres	Sweet clover	- 76 acres
Seeded rye	- 266 acres	milo	- 7 acres

Oats was seeded with red clover on 39 acres.

One of the better operators reported a corn yield of 57.5 bushels/acre. Average for the entire refuge would be somewhat short of 40 bushels.

Rye averaged around 20 bushels, however one permittee obtained 48 bushels per acre following a fair plow-down crop of red clover.

In the fall of 1970, we seeded about 20 acres to Elbon rye, primarily to see if it would produce this far north. It froze back severely that fall, and when the snow left in the spring, appeared completely dead. There was a fair amount of browse available early in the fall, but none during the spring migration. The rye recovered to some extent and produced a poor - estimated 8-10 bushels/acre - seed crop. We broadcast 150 pounds per acre of 5-14-42, and disced the rye down in mid-September. It looked fairly good this fall.

Intermittent rains in June kept the low ground too wet for millet farming. Since we had an excellent crop of Japanese millet on this area last year, we expected at least a fair volunteer stand. This did not develop. Lots of seed sprouted in May, grew to about 3 inches and dried up in August. The plants were obviously too thick in many places, but one would expect a few good plants, at least on the thin spots. I found only a very few plants that attempted to produce seed. These were about 18" tall with $1\frac{1}{2}$ inch seed head.

C. Collection and Receipts

Nine surplus buildings were sold by sealed bid for \$1,553.14.

D. Control of Vegetation

Atrazine is the standard herbicide for quack grass control in corn. It was applied at a rate of 1-2 pounds per acre to most of the corn land.

Scattered patches of leafy spurge were treated with Borolin granules. Control appears to be excellent. This years efforts were directed mainly at scattered plants on the fringes of what were heavily infested areas.

A.M.S. was used for poison ivy control adjacent to the wildlife trail and at the canoe access areas.

D.N.C. and native grass seeding except the burned areas, were clipped twice with the Mott mower.

E. Planned Burning

Three small burns were conducted on an experimental basis during the season.

The first, on May 19, covered approximately five acres of big bluestem, little bluestem and switch grass, seeded in 1967. A moderate stand of quack grass existed over most of the area. In the fall of 1970, the general appearance of this field was of a fairly good stand of little bluestem, considerable quack and very scattered clumps of big bluestem.

The response of big bluestem to the burning was quite evident. Instead of a few clumps, the field showed a good to excellent stand, four to six feet tall. This is, incidentally, the only time big bluestem has showed up as more than a trace in any of our seedings. A small area at the end of the field was left unburned as a control. The unburned area showed a complete absence of big bluestem, and gave the same general appearance as the entire field did in 1970. The increase of big bluestem was apparently at the expense of the little bluestem. Switch grass was evidently seeded at a lighter rate, as plants were scattered throughout the field.

On June 16 and 18, two fields of approximately 25 acres each were burned prior to seeding native grasses. The vegetation here consisted of a mixture of blue grass, quack grass, and a variety of weedy forbes. Fire removed the accumulated ground litter, and killed but left standing much of the top growth. By early September, rows of native seedlings could be easily seen. The plants were 3-4 inches tall by early October. This is the best first season growth we have seen in this area. However, burning does not completely solve the problem. In low spots, where soil fertility and moisture conditions were more favorable, quack grass still offered severe competition. In these areas, it was impossible to follow the drill rows. The seedlings, when found, were $3/4$ - $1\frac{1}{2}$ inches tall and quite slender. It is interesting also that roundhead lespedeza, Lespedeza capatata, was 8-10 inches tall at the time of the burn. It survived, regrew, and set seed, although the stem height was reduced by about two-thirds.





An excellent stand of Big Bluestem, following a burn in May, 1971. In 1970 this field looked quite similar to the bottom photograph. The area on the right has not been seeded.

The fire was cut off as indicated by the green line. Note the absence of Big Bluestem in the foreground, and in the bottom photograph.



An unburned section of the same field. The predominant vegetation is Little Bluestem.



This field, shown above before burning, was burned June 16, and seeded June 17. Note the rows of native seedlings and control of undesirable vegetation shown in the bottom photographs taken October 6.





Burned and unburned
quack grass.
The unburned area
definitely is not
attractive to geese.
The burned area may
be.



Burned August 5.
Average 4.4 blades
per plant - 8.2 in.
maximum length. 1.2
blades per plant are
brown. Completely
frost killed by
Nov. 1.



Burned August 18.
Average 3.5 blades
per plant - 6.5 in.
maximum length.
Trace of brown
blades. Completely
frost killed by
Nov. 1.

Burned August 27.
Average 3.1 blades
per plant - 6 in.
maximum length.
No brown blades.
Still green Nov. 10.
Photos made Oct. 6.



Since quack grass is the primary vegetation on many idle fields at Sherburne, the idea developed that it might be useful as goose browse if properly managed. With this in mind, we divided a 30 acre field of quack grass into three strips. The first strip was burned August 5, the second August 18, and the third August 27. It was also thought that a stand of foxtail grass (Alopecurus sp) might develop following the burns. This did not occur. There was however, an identifiable difference in the regrowth, and a marked difference in susceptibility to frost. On November 10, the two early burns appeared completely dead, while the late burn was nearly as green as an adjacent rye field. Why this should be true, I do not know, but a similar situation was observed last year. In 1970 a series of three burns, in early, mid, and late August was completed on a bluejoint (Calamagrostis canadensis) meadow. Here, also, the late burn remained green until mid-November, while the earlier burns killed back two to three weeks earlier.

Whether or not fresh, green quack grass will be utilized, will depend on the geese. Geese are still in short supply at Sherburne. However, the only flock of blue and snow geese known to have set foot on the Refuge in 1970 was on the burned meadow. The only flock of blue and snow geese known to have stopped in the fall of 1971 was on the burned quack grass field.

F. Fire

One small "unauthorized" fire occurred on May 15. It was of suspected incendiary origin. The fire was burning between County Road 11 and the St. Francis River, an area we would probably have set up as a prescribed burn in 1972. Since the fire was reported at 11:30 PM, and caused considerable local interest, including a volunteer fire fighting crew, we extinguished the north edge, about $\frac{1}{4}$ mile, and allowed the fire to burn out against the river to the east and a drainage ditch to the south. Result - fairly good brush control on approximately 30 acres.

IV. RESOURCE MANAGEMENT

A. Grazing

One permit for intermittent grazing on four acres - \$10.00.

B. Haying

Four permits were issued for harvesting 73 acres of alfalfa, 10 acres of Reed's canary grass hay, after July 20, for a fee of \$1.00/acre. Eighty-eight acres of red clover hay was harvested by 5 permittees as part of their farming contract.

C. Fur Harvest

Sherburne was open for beaver trapping during the spring of 1971. Two permits were issued, no report of catch was received. The Refuge was closed to all trapping in the fall of 1971.

D. Timber Removal

One contract was issued for harvesting 439 Scotch pine and 20 red pine Christmas trees. Total receipts for this operation were \$418.00.

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Progress Report - Captive Canada Goose Flock and Release of Breeding-Age Adults

This year we decided to forego artificial incubation of eggs and pairs were allowed to hatch their first clutch. Thirty-six mated pairs laid 192 eggs and hatched 119 goslings for an over-all hatching success of 61.9%. This included five pairs of two-year-old geese which laid 21 eggs and hatched 16 goslings for a 76.2% hatching success! As expected, clutches from two-year-old birds were smaller by one or two eggs on the average as compared to those of older geese. As soon as a brood hatched and the goslings dried off, we moved each family into an adjacent four-acre pasture complete with pond.



Soon after several family groups were placed in the enclosure, "gang brooding" began to occur. One pair of geese eventually ended up with a brood of 27 young. Two-year-old geese exhibited little or no defense of their young and quickly lost them to other broods. Of the 119 young hatched, five died in the nest and the remaining 114 goslings were originally placed in the enclosure with their parents. Of these 95 or 82% were raised to flight stage. A few goslings were trampled at the feeders, owls took some, and several got through the fence and were probably taken by ground predators. We plan to repeat this method of handling young again next year with some refinements.

During April of 1971, 33 adult giant Canada geese were released at three locations on the refuge. Primary wing feathers were pulled on March 1st and colored plastic leg bands were placed on the birds so that mated pairs could be identified. Of the 33 birds, 24 became members of mated pairs. By the second week in April, the north end of Rice Lake and Long Pond began to open up. Regrowth of the primaries was about three-fourths completed at this time.





TABLE III

Date	Location	No. of Birds
April 7	North end of Rice Lake	4 mated pairs
April 9	North end of Long Pond	4 mated pairs
April 13	NE. end of Orrock Lake	4 mated pairs
April 15	North bay of Orrock Lake	9 unmated birds

By the time of the last release, the primary wing feathers were fully grown and the birds were capable of flight. During the first few weeks after release things got a little hectic. Geese were seen walking down the Mahnomen Trail, and one pair began hanging around the Headquarters.

Several geese were attracted to the new grass along County Road # 5 and often had to be chased off the highway. Two geese were killed by cars, then the birds settled down and we began to find nests. One pair nested in a willow clump on a small marsh just north of the Assistant Manager's residence. To our knowledge, this was the first nesting of the giant Canada goose in this area since the turn of the century.



Five of the twelve pairs released nested on the refuge. Two nests were destroyed by predators and the three successful nests produced 14 young. Although the sample is small, it appears that the birds showed a preference for small potholes and areas along the river for nesting. Pairs released at Rice and Orrock Lakes moved out of these areas to nest. Soon after hatching, however, pairs moved back into these areas with their broods. Known mortality included two birds killed by cars, one adult and two young killed by dogs, and three hunter-killed birds. Two of the latter were shot illegally, one at Bergerson Slough and the other just off the east boundary of the refuge.

B. Sedge Productivity Study

Dr. John M. Bernard, Associate Professor, Department of Biology, Ithaca College, Ithaca, New York, initiated this study early in 1971. This study holds promise of developing basic information of direct benefit to some aspects of wetland management. The study outline follows, as will the first annual report - if it is received by the time the narrative goes to press.

WILDLIFE MANAGEMENT STUDY OUTLINE

Division of Wildlife Refuges, Region III Project: Sherburne

1. Title of Study:

A comparative study of primary production, life history and mineral cycling in sedge fens and associated wetlands.

2. Objectives:

- A. To determine the relationship between primary production and nutrient regime in sedge fens and other wetlands.
- B. To determine the nutrient status of plants at different stages in their life history.
- C. To determine nutrient levels in wetland ecosystems at different times during the growing season.
- D. To determine mobilization and movement of nutrients in sedges, with particular reference to spring mobilization and fall dieback levels both above and below ground and to the nutrient supply of basal axillary shoots in relation to that of the parent plants.
- E. To determine the role of roots and rhizomes in nutrient storage in these ecosystems.
- F. To compare life history of three sedges with respect to overwintering, emergence of new shoots, flowering, fall dieback and particularly to root and rhizome production.

3. Justification:

Investigations of primary production in ecosystems have usually been hampered by a lack of basic information concerning the species in the ecosystem. Detailed observations and information on the species life history, chemical composition, and morphology are in most cases lacking. The lack of such information is unfortunate since such factors exert a profound influence on the rate and amount of primary production in ecosystems.

For example, there is evidence that perennial wetland species may retain some nutrients in their tissues year after year, transporting them below ground to the roots and rhizomes for storage in the winter and above ground to the shoots, leaves, and flowers in the summer.

The magnitude of this storage has great importance not only to the functioning of wetland ecosystems but also to certain questions of wetland management. If these

wetland species did retain large amounts of nutrients one could expect:

1. A one time application of fertilizer (even sewage effluent) would have a long-time effect on production.
2. Wetlands would act as filters of pollution so that fewer nutrients would reach a lake to hasten eutrophication.
3. A normally poor site may have better than expected production since necessary nutrients are available in the plant tissue.
4. Marshes surrounding lakes would tie up most nutrients leaving few for algae growth in the open water.

A study which has been in progress at the Sherburne National Wildlife Refuge since January, 1971 has provided a good deal of basic information concerning certain seasonal and life history events and their relation to primary production in a wet Carex rostrata meadow. Although the data are not all tabulated at this time a number of important generalizations can be made. They are:

1. There is a considerable amount of live Carex both above ground and below ground frozen in the ice in winter.
2. New shoots emerge throughout most of the growing season from basal axillary buds but new shoots from rhizomes emerge only in the fall.
3. Root and rhizome growth begins in midsummer (Ca. July 1). One very important finding of this study has been the determination of root production.
4. Each shoot lives and is a part of the production of the fen for three (3) years and it is possible to identify shoots of different ages.
5. There is no midsummer cessation of growth in the fen since new shoots are always emerging.
6. The weekly sampling program used has demonstrated the need for frequent sampling in productivity studies.
7. Other data on Carex rostrata have not yet been tabulated and still further information on root production, growth of shoots and roots in the fall, and fall dieback is still being collected.

With this one year study of Carex rostrata as a guide, the time is now ripe to develop a more detailed investigation of sedge production, life history, and nutrient regime not only in the Carex rostrata meadow but in the Carex riparia and Carex lasiocarpa ecosystems as well so that all three of these common and important wetland sedge species can be compared. Attention will be paid to first comparing overwintering, flowering, and particularly to the role of autumnal and vernal shoot emergence in annual production and second to determining nutrient levels in different tissues of the species at different times of the year.

Since the Carex rostrata life history has now been worked out, it will be possible to follow nutrient level changes

in young, mature, and flowering shoots in both above ground and below ground tissues. Field observations on the other sedge species have indicated that phenological events are similar in all three sedge species so that comparisons can be made.

Thus, production and nutrient regime, life history and nutrient regime, and life history and production can be compared in these species.

Along with the study of the three sedge species, one other common wetland species will be studied for comparison. Possibilities would be Typha latifolia or Phragmites communis, both of which are widespread and important wetland species.

Ideal sites for this study have been located on the Sherburne National Wildlife Refuge. All the species mentioned occur in large almost pure stands on the refuge.

Correlative Information:

Wetland ecosystems have received relatively little attention from ecologists. This is unfortunate since wetlands are widely distributed, frequently are important as regional water storage systems, and are usually highly productive owing to optimal water supply and favorable nutrient conditions brought about by accretion of silt.

There is a great need, therefore, for more information on the productivity of wetland ecosystems. Such information may be of immediate value to conservation ecologists concerned with waterfowl, fur bearers and game animals in wetland habitats; and may also be of interest to those scientists interested in the hydrological management of wetlands, either in the natural or drained state.

There are few studies which have focused on nutrient cycling in wetlands and none that I know of that take into account the age of the plants and the seasonal development, both necessary to a full understanding of ecosystem functioning.

Finally, I have been assured of space in Dr. Eville Gorham's laboratory at the University of Minnesota. Sample preparation for nutrient analysis and other tests will be conducted there.

4. Procedures:

1. Literature Review: A review of published information is being conducted at the present time and on a continuing basis.
2. Data Collecting: Data will be collected by Dr. John M. Bernard, Mrs. Florence A. Bernard and by

Mr. Donald L. Tilton, a University of Minnesota graduate student.

3. Methods of Data Collection:

A. Production Measurements

1. Harvest Method - This method has been widely used in productivity studies. In this study, fortnightly harvesting of roots, rhizomes, shoots and litter will be made, the former by a soil coring tube or post, hole digger and the latter by a replicate series of ladder quadrats.

The study of the underground plant parts will be facilitated since the soil will be primarily organic matter in the wetlands studied.

The above ground standing crop will be harvested in three or more sets of five contiguous quadrats (Ladder Quadrats), each 25 x 25 cm. This method reduces the "edge effect" of deciding whether a particular plant is in or out of the quadrat and also gives a better indication of density in working with these species which are frequently somewhat clumped or aggregated. The clipped material will be subdivided into one of four categories: young, mature, attached brown and litter.

2. Supplemental Productivity Measurements - As an adjunct to the harvest method, measurements will be made of the populations in permanent quadrats. These measurements will include counts of the number of shoots present, the length of shoots and leaves and the weight per shoot. The latter value will be determined by harvesting shoots of similar size in nearby quadrats. These plots will have been established in the sedge meadow by spring 1972.

B. Chemical Measurements

1. Nutrient Analysis - Samples of rhizomes, roots if possible, young shoots, mature shoots, flowering shoots and flowers will be analyzed for mineral nutrients (P, K, Ca, Si, Na, Fe, Mg, Zn, Cu, Mo, Mn, B, Pb, Al, As, Ba, Co) by the Spark Emission Spectrograph Analysis at the Agriculture School, University of Minnesota and N and Sulfur by appropriate techniques. Preliminary analysis of Carex rostrata material is currently being analyzed to test the method.

2. Further chemical analyses will include determinations of energy and carbohydrate, fat, and protein content of the harvested materials.

C. Life History Measurements - Mass collections will be made during the growing season to determine the life history of the species.

4. Data Analysis and Interpretation:

Data will be summarized by the end of 1972 and a copy furnished the refuge. Primary responsibility for analysis and interpretation of the data collected will reside with Dr. John M. Bernard.

5. Cooperators:

Dr. Eville Gorham, University of Minnesota will be available as an unpaid consultant on this project.

6. Responsibility:

- | | |
|------------------------|--|
| A. Refuge Manager | : Provide some assistance in travel to site, particularly in winter. |
| B. Dr. John M. Bernard | : Principal Investigator. Responsible for this study. |
| C. Mr. Donald Tilton | : Graduate student, University of Minnesota. Project assistant and responsible for collection of data from September 1 until fall dieback. |

7. Cost:

Salaries:

John M. Bernard	\$ 1500
Donald L. Tilton	700

Equipment and Travel	200
----------------------	-----

TOTAL	\$ 2400
-------	---------

8. Schedule:

The study will begin June 1, 1972 and be completed by December 1, 1972.

9. Reports:

- A. Data summarization: Submitted by December 1 of each year.

- B. Annual Report: Due by February 1 of each year.
- C. Completion Report: Due July 1, 1973.
- D. Distribution: Copies of the above reports will be provided the Regional Office, Central Office, Regional Biologist, and the Refuge.

10. Publications:

It is anticipated that most of the studies outlined here will be published in scientific journals.

11. Submitted by:

John M. Bernard, Associate Professor, Department of Biology,
Ithaca College, Ithaca, New York 14850

SUBMITTED BY: _____

John M. Bernard
John M. Bernard

TITLE: _____ Associate Professor

DATE: _____

September 23, 1971

C. Refuge Herbarium

Early this year Dr. John W. Moore, retired Professor, Department of Botany, University of Minnesota, was employed to develop a collection of plants of Sherburne National Wildlife Refuge.

In sixteen field trips from June through mid-October, he collected specimens of 631 species. When properly mounted and made available for reference, this collection will be a valuable addition to the refuge resource material.

Dr. Moore's quick wit, and seemingly boundless energy (70 years old) made our association with him a pleasure.



Dr. J.W. Moore making a field identification of the rare Dangle-wangle vine (Dangleissium mooreissi).

D. Proposed Natural Area

In the SW $\frac{1}{4}$, SE $\frac{1}{4}$, Section 10, Orrock Township is a spot, which while possibly not unique in this general area, is unique within the Refuge boundary. Covering approximately 20 acres of rolling sand hills, it shows quite vividly the transition from open sand dunes, to grassland, to hardwood forest.

The topography of the area is such that only a small portion was ever cultivated. This portion was seeded to native grasses in the spring of 1969. The remainder of the area evidently was used as pasture land for many years. The resulting over-grazing, coupled with wind action created two large "blow outs", which are now covered with vegetation except for four small areas.

The general vegetative pattern in the area is hardwoods, primarily oak, on the north and east slopes, dryland sedges, prairie grasses and forbs on the southern and western exposures.

Prairie sandreed, Calamovilfa longifolia, is the most obvious tall grass, and is the most aggressive in closing up the remaining open areas. Blue gramma, Bouteloua gracilis, is probably the most common short grass. Sideoats gramma, Bouteloua curtipendula, occurs here as scattered clumps. To date it has not been found at any other location on the refuge.

Two species of leadplant, Amorpha fruticosa and Amorpha canescens, grow side by side, providing an interesting comparison.

The only specimen of creeping savin, Juniperus horizontalis, that has been found on the refuge is located in this area. Its more common relative, prostrate juniper, Juniperus communis, also grows nearby.

False heather, Hudsonia tomentosa, probably has the most specific growth requirements of any plant in the area. It is a pioneering species found only on open dunes and sand blows. A search was made this summer of all similar areas on the refuge, but the plant was not found.

It is of some interest that this plant is reported in the Catalogue of the Flora of Minnesota, page 30, as noted by Thomas S. Roberts in 1884, "on sand hills in Section 21, Orrock, Sherburne County--(plentiful)." This location is approximately 1 $\frac{1}{2}$ miles southwest of the refuge area.

Because of its fragile nature, the major portion of this area has been fenced, to permit only authorized access. Damage from trail bikes and four-wheel-drive vehicles was evident this summer.

The area is adjacent to County Road #4. With proper planning and interpretation, it could be used as a very interesting educational stop. While not productive of wildlife, it is a living example of how an entire area changed from blowing sand to wooded hills. We would like to see it recognized as such.



General views of the proposed natural area. Note established timber in background. Scattered young trees in the more stabilized prairie areas.





Prairie sandreed
Calamovilfa longifolia
 Covers much of the once
 bare sand hills.
 Exposed sand is the
 result of passage of a
 few trail bikes.

Leadplant
Amorpha canescens





Blue gramma
Bouteloua gracilis
is a common short
grass in this area.

Sideoats gramma
Boutelous curtispindula
has been found only in
this area.



False heather
Hudsonia tomentosa
has been found
nowhere else on the
refuge.



E. Indian Mound Excavations

Professor Richard B. Lane and his students from St. Cloud State College completed their work in the Indian mounds during the summer of 1971. The following is the final progress report prepared by Professor Lane for the Sherburne National Wildlife Refuge.

ARCHAEOLOGICAL SUMMARY
SHERBURNE NATIONAL WILDLIFE REFUGE
1971 EXCAVATIONS

by:

Richard B. Lane

Assistant Professor of Anthropology &
Curator of the Museum of Anthropology

Department of Sociology & Anthropology
Saint Cloud State College
Saint Cloud, Minnesota 56301

Field Summary

The 1971 excavations on the Sherburne National Wildlife Refuge were conducted under the authority of a U.S. Department of the Interior Federal Antiquities Act permit (number 71-MN-029). Under the articles of this permit, excavation could be carried out from the 15th of May through the 15th of October, 1971. Preliminary survey and mapping were done on the Refuge from the 15th of May through the 15th of June; there was further survey and final mapping done during the period 25 August through 15 October. The intensive, full scale period of excavation corresponded to St. Cloud State College's field program in archaeology -- 16 June through 21 August -- and was carried out with only one short interruption, due to Indian militancy. Excavation was temporarily halted from the 29th of July through the 2nd of August (involving a loss of only two days of full-time excavation) in order for the Minnesota Indian Affairs Commission and the administration of St. Cloud State College to come to an agreement regarding the "legality" of the excavations. No subsequent problems, in the form of confrontation or active protest on the part of the Minnesota Indian community, developed.

1971 ARCHAEOLOGICAL SUMMARY

The 1971 excavation crew consisted of 15 undergraduate students (12 from Saint Cloud State College, 2 from the University of Minnesota, and 1 from the College of Saint Benedict), 1 graduate student (from Saint Cloud State College), 2 site supervisors, or foremen, (both senior anthropology majors who had excavation experience prior to this season), and myself as archaeologist-in-charge. -- This was without doubt, the best organized crew and season of excavation at the Refuge during the past three seasons.

Two major areas of excavation were chosen for this season's work. The Northern Mound Group (now officially named the Refuge Site in the state of Minnesota site catalog) was selected for small scale excavation in order to test a bilobate, or figure 8, shaped mound -- mound #31 on the site maps. The most extensive and intensive excavation was planned for and carried out in the Southern Mound Group (now officially named the Honker Site in the state of Minnesota site catalog). Three mounds (mounds A, B, and F) and the probable village area in the field adjacent to the mounds, were subjected to the entire season of excavation.

During the course of the summer excavations the sites were visited a number of times by Dr. Elden Johnson, the Minnesota State Archaeologist, as well as by other professional archaeologists with an interest in the central Minnesota area. On the 26th of June, a large percentage of the Minnesota Archaeological Society visited the sites and some helped in the excavation of Mound A in the Honker Site. -- A preliminary paper on the Honker Site was read at the Midwest Archaeological Conference in Cleveland on the 28th of October, 1971. A summary paper on the three seasons of excavation at the Refuge and Honker Sites was read at the March, 1972 meeting of the Minnesota Archaeological Society in St. Paul.

Artifact Summary (Materials Recovered)

Refuge Site: /Northern Mound Group/

Mound #31 was the only area subjected to excavation during this season and was not completely excavated (the materials from the mound are still in the process of laboratory analysis at this time). The fill of this mound, like the others close by excavated in previous seasons, was found to be relatively rich in artifactual materials -- stone tools and tool making debris, pottery sherds, and some organic material -- and two secondary, bundle burials were found in the upper levels of the mound near the peak of the northern lobe (these were obviously placed in the mound well after the mound had been constructed).

Of the slightly more than 1500 recovered stone items from the mound fill, there were about 30 definitely identifiable tools -- mostly projectile points, but with a few knives and scrapers. The majority of stone material consisted of waste and secondary flakes with a few cores and core fragments.

The ceramic material consisted of about 850 broken sherds of various pottery types. Some 20 of these were rim sherds and may result in a partial reconstruction of 10 to 12 vessels. The majority of ceramic material recovered was in the form of decorated and undecorated body sherds, or fragments, and will be of some value in cultural reconstruction when they are fully analyzed.

The two burials, both bundle burials of secondary type, were fragmentary and generally poorly preserved. This is probably a function of being high up in the mound fill and located near a major pot-hole in the mound -- the drainage and close exposure to surface conditions undoubtedly played a major part in the disintegration of the bone after original burial. There appear to be the remains of three individuals (two in one burial, and a single individual in the

second burial). Neither of the burials has been fully examined and/or analyzed at this time.

Honker Site: /Southern Mound Group/

Three mounds were excavated in the Honker Site Area -- the fifteen other mounds in the area were mapped, but seem so similar to the mounds tested that any further excavation would probably be redundant in terms of materials recovered. The mounds were all low, none more than 1.5 feet above the average terrain level, and most averaged about 30 feet in diameter. -- No skeletal material, of either man or animal, was recovered from the mounds. This, again, probably due to the good drainage and the close exposure to surface conditions.

Mound A produced a fairly large number of cultural materials from the fill. 910 stone items were found -- 8 projectile points, 5 knives, 4 hammerstones, 1 abrader, 21 core fragments, 12 utilized flakes, and 859 waste or non-utilized flakes. The mound was poor in terms of ceramics with only 28 sherds recovered (this mound had been disturbed by plowing, and a great deal of the ceramic material may have been broken or disintegrated beyond recognition by this) -- all body sherds, only 14 of which showed any trace of decoration.

Mound B produced more material than the other mounds, but this is believed to be a function of the amount of excavated area -- more of Mound B was excavated than any of the other mounds. 1942 stone items were found -- 17 projectile points, 5 knives, 5 scrapers, 4 hammerstones, 3 abraders, 1 blade, 64 core fragments, 44 utilized flakes, and 1799 waste or non-utilized flakes. The pottery from Mound B was fairly well preserved, but all broken -- although there may be a few restorable vessels. A total of 785 sherds were found -- 34 decorated rim sherds, 212 decorated body sherds, 207 undecorated body sherds, and 332

exfoliate/split body sherds (impossible to tell if decorated or not).

Mound F was the smallest excavation of the summer and the material totals reflect this -- only some 200 square feet of the mound were opened. 161 stone items were recovered -- 3 projectile points, 2 knives, 4 scrapers, 2 hammerstones, 2 abraders, 4 core fragments, 10 utilized flakes, and 134 waste, or non-utilized flakes. 51 sherds were recovered -- 3 decorated rims, 34 decorated body sherds, 3 undecorated body sherds, and 11 exfoliate/split sherds.

The village area presented some problems. The depth of the plow zone (to more than a foot in some cases), and an erosional surface at the base of the plow zone precluded any chance of finding structural evidence in the area. (No post holes, wall trenches, pits, or hearths were located - although the materials in the plow zone and on the surface definitely indicate village activity in the area. The village, in effect, has been eroded and plowed away - all that remains are some of the imperishable materials.) Of the 716 stone items found -- 19 projectile points, no knives, 9 scrapers, 21 core fragments, 25 utilized flakes, and 642 waste, or non-utilized flakes. 680 ceramic items were found in the village area -- 23 decorated rim sherds, 449 decorated body sherds, 3 undecorated body sherds, and 205 exfoliate/split body sherds.

The total number of artifacts recovered from the Honker Site during the 1971 excavation season then, is 5230 items. Of this total, there were 1545 ceramic items and 3685 lithic (or stone) items. -- The site can be considered, in comparison with other central Minnesota sites, relatively rich in terms of artifactual materials. Ideally, some further excavation should be carried out in the area of only to give further evidence of the associations present.

Cultural Summary:

Refuge Site: /Northern Mound Group/

Mound #31, on the basis of materials recovered as well as the spatial location and morphology of the mound itself, pretty definitely belongs with the cultural group who built Mounds #1 and #4 (excavated in 1969). These people, who constructed the cluster of mounds including #1, #4, and #31, most probably belonged to the archaeological culture we call Late Woodland and probably date to somewhere between A.D. 500 - 800. They were, basically, hunters and gatherers and obviously exploited the Rice Lake environment to the fullest - as evidenced by their time and energy in building mounds rather than in the full time food quest. -- In a later period, possibly even proto-historic (A.D. 1400 -1500 is my current guess), another group or groups of people used to already existing mounds for burying their dead -- digging into the mounds, planting a bundle of bones, and then refilling the hole. The three secondary bundle burials encountered in Mound #31 are obviously of this type.

Honker Site: /Southern Mound Group/

Mounds A, B, and F, on the basis of the similarity of materials found, and on the spatial clustering and similar morphology of the mounds, were most probably built by the same cultural group over a relatively short period of time (probably more than 20 but less than 100 years). The materials in the mounds, and the materials in the village area, lead me to believe that the people who built the mounds were living adjacent to them in what we consider the village area ((although no structural evidence of a village was found (see above section, page 5 of this summary)). There is positive evidence that the village area and the mounds are associated in spatial and cultural terms, so I think too that they

must be temporally associated - that is, the people occupying the village area did, in fact, build the mounds as well.

Although no absolute dating (Carbon-14, or other) has been done on the Honker Site as yet, the materials can be pretty well dated by comparison to other dated materials of similar types from other sites in Minnesota. The most likely time period is that which the archaeologist calls the Late Prehistoric, or, in some areas, the Mississippian. This would place the occupation of the site somewhere between A.D. 1000 - 1300. (This, by the way, is about the same time we think that Mound #26 on the Refuge Site was built - although I can't be sure that the same group built that as built the mounds on the Honker Site.)

The people living at the Honker Site were still hunters and gatherers, still exploiting the environment, but were beginning to use new materials -- such as the wild rice which was definitely in the area by this time; also they were using the riparian and lacustrine environments, as evidenced by fish bones and such things as turtle carapaces, more than had their predecessors in the area -- and seemed to be generally better adapted to the area than the Woodland peoples. It is possible that these people may have been in the direct ancestral line to the historic tribes in the central Minnesota area.

VI. PUBLIC RELATIONS

A. Recreational Uses

1. General Information Public use increased again this year. There were an estimated 37,477 visitors in 1971 as compared to 32,012 in 1970, resulting in an increase of 17%.

2. Wildlife Observation A positive feeling is beginning to develop among the local people towards the refuge. More and more are coming to the refuge showing their friends the facilities being provided, and to observe wildlife.

A continuing attraction is the display pen where the breeding stock for the giant Canada goose is kept. This display pen was built in the past, along with a tower and panels for the visitor to observe and learn about our goose program. Although this will eventually be phased out, the interest by local people to drive out on a Sunday afternoon, climb the tower in order to observe geese for 15 minutes, hasn't lost it's appeal.



A very attractive, and informative panel painted by the Assistant Manager, Bob Drieslein, has helped the visitors to identify the birds found in the display pen.

Another attraction has been the Mahnomen Wildlife Trail. Comments have been received from local citizens saying they bring friends out to see the trail and tower (which is located along the trail). Last year, the trail received 4,405 visitors as compared to 8,220 this year, resulting in a 46% increase.

An example of wildlife commonly seen while walking the Mahnomen Wildlife Trail.



Visitors have also given comments saying they enjoy driving the refuge roads observing wildlife, especially the white-tailed deer. From the monthly recreational reports, in 1970, 8,310 wildlife observers used the refuge as compared to 16,290 in 1971, resulting in a 46% increase.

3. Summer Trails

a. Hiking Trails - There are approximately ten miles of hiking trails, which maintenance wise, involves mowing once during the late summer. The biggest problem that hiker's encounter with the seasonal changes, are the insects. Ticks during the late spring and early summer, are then replaced with an increasing population of mosquitos, plus the noisy deer flies, all resulting in little Homo sapien use. Information preparing people both mentally and physically (shorts and short sleeve shirts leave areas of sensitive skin exposed for wildlife to really enjoy), visitors may be more inclined to try the outing.

b. Interpretive Trail - The 46% increase on the Mahnomen Wildlife Trail includes use by bicycles, trail bikes, horses and snowmobiles. This resulted in a change to the entrance as shown in the photograph. A routed sign stating, "Hiking Trail Only - horses, motorized vehicles are prohibited" was added and so far this has solved the problem.



Additional remodeling was completed this year on all interpretive trail signs. The original signs and mounts which were erected three years ago, were beginning to give problems. The remodeling involves a five foot pine post buried two feet into the ground. The top of the post was cut on a 25° angle, then a $\frac{1}{4}$ " plywood (preserved with wood preservative) was placed on top and had three, two inch wood screws counter-sunk through the plywood and into the post.



On the back side of the plywood, four wood screws, one in each corner, were screwed through the plywood and into the backside of the interpretive sign.



The pine post's surface was also experimented with. In the dark environment under the tree canopy, the posts were painted with a dark preservative to blend with the tree trunks. In the open areas the pine post was left to weather and blend with the lighter colors of the field environment (a wood preservative was applied to the parts below and just above the ground line).

One observation as far as cedar signs versus redwood, the cedar seems to deface easier than the redwood. On damp mornings, the surface of the cedar sign becomes soaked with moisture and with the slightest abrasion the ink is rubbed off. The redwood's surface has a closer wood grain and does not absorb the moisture as readily, and therefore provides a more permanent surface for the ink.



Dark pine posts for interpretive sign
blends well in wooden canopy.

Weathered pine posts for interpretive
sign blends well in field environment.





One of the new public use activities occurring on the Refuge.



Boy Scout is busily spreading native seeds across the white covered land.

4. Winter Uses Our winter public use, both organized and individual, is increasing each year. There are individuals enjoying the snow world by means of snowshoes either on the interpretive trail or stretching out across country. Organized groups have used the Refuge's supply of bear paws resulting in 90 visitors enjoying the winter atmosphere.

Another winter sport which is surpassing snowshoeing is cross-country skiing. Although this winter sport has been around since before 1849, it has been increasing with tremendous leaps and bounds within the past three years, to where businesses supplying the equipment in the Twin City area can not keep ahead of the demand. On the refuge, there have been two very distinct groups enjoying the winter environment. The professional, one who has perfected the gliding stride covering miles across country, and the novice who skis one mile and is exhausted. Visitors who have perfected the sport enjoy trail lengths of 3 or more miles, while the novice needs an established trail, shorter in length, in order to learn the techniques of the sport. Our Mahnomen Trail seems to be the appropriate length for them.

Another winter activity, on a trail basis in Region III, is a snowmobile trail. The Refuge trail, approximately 10 miles long, is going into its fourth winter. The snowmobiler, in general, has been very congenial and has obeyed the Refuge regulations. The operators have generally stayed on the provided trail, and have not created the litter problem which is common during snow-free months. There have been a few violations involving cross-country use and on unplowed roads. When comparing snowmobile use outside the Refuge with the interior, the cross-country use is slight. It may stem from the news releases informing the public of the regulations and/or the patrolling carried out each week-end by Refuge personnel. The biggest problem with road trespassing is the lack of knowledge by the public concerning the former county roads that have been turned over to the Refuge.

5. Conservation Projects The Refuge receives a number of requests for organized groups, such as Boy Scouts, to carry out conservation projects on the Refuge. One example, is spreading native seeds.

6. Other Uses Sherburne is acquiring many new public use activities. Some are appreciated, some are not. Some visitors feel the refuge would be an ideal dumping ground. The visitor left identification among the debris leading to the County filing a case in court against the litterer. It resulted in a \$29.00 fine.

B. Environmental Education

Sherburne's Environmental Education program involves three basic divisions: (1) the typical guided or self-guided tour; (2) individual teachers who have designed their own environmental education lesson; (3) the Golden Valley Environmental Science Center's leaflet program. Including the three above divisions, there have been 20 school districts represented at Sherburne this year.

The Refuge is slowly phasing out the guided tours and converting to the environmental education program being promoted by the Golden Valley E. S.C. and the Bureau. This program has been designed to withdraw Refuge staff involvement, in hopes that the teachers and their schools will become independent from guided tours. The program entails two series of leaflets which are designed to build confidence for the teacher to instruct an outdoor classroom. The first is the tour series. Within this series, the teacher and her class gradually spend more time outside the bus. This has outdoor lessons designed for the teacher with the site location on the Refuge. At the completion of this series, it is hoped the teacher will begin to design their own lessons. Already, two teachers who have had the Golden Valley E.S.C. training have become independent and are designing their own lessons.

It has taken efforts by the Refuge staff, school boards, administrators, teachers, Ed Landin and Karen Josted, but results are becoming evident by comparing the program in the last three years.

In 1971, the leaflet program has included 10 groups totaling 367 visits, with an average class size of 37 students. This is a beginning step to a true environmental education program.

C. Refuge Visitors

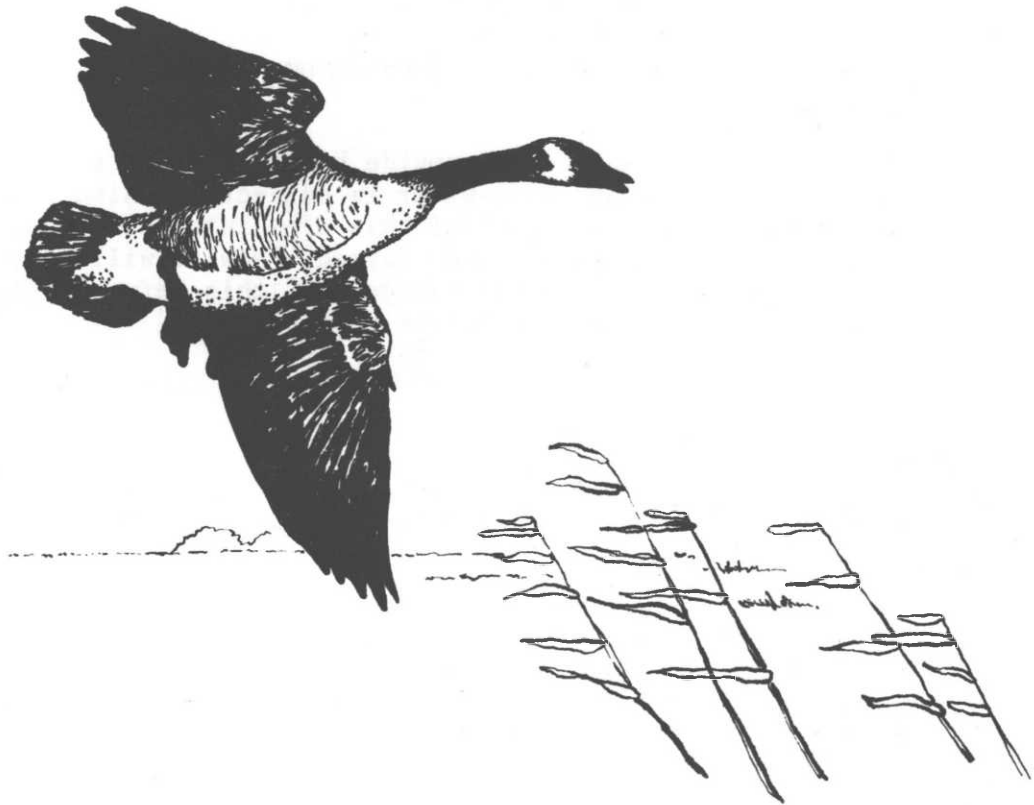
The following is a condensed list of some of the more significant visitors to the Refuge during the year.

Date	Name & Organization	Purpose
1/19	Robert Rollie, North Star Ski Touring Club	Ski survey
2/18	Robert Ballou, C.O., Washington	Snowmobile trail
2/18	Dwight McCurdy, C.O., Washington	Snowmobile trail
3/2	Roger Grosslein, Minn. D.N.R.	Snowshoe trail
3/8	Joe Kotok, Agassiz NWR	Systems Workshop
3/8	Thad Fuller, Agassiz NWR	" "
3/8	Tom Atkins, Agassiz NWR	" "
4/12	Dr. Dave Weaver, Henn. Co. Park Reserve Dist.	Visit goose pens
4/13	Chuck Wechel, Minn. D.N.R.	Photography
5/26	Dwight McCurdy, C.O. Washington	Public Use Study
6/9	S.C.S personnel from Minnesota and North Dakota	Observe plant materials plots
6/23	John Lyon, Anaconda, Colorado	observe rodent test
6/23	Gary Sparks, Anaconda, Colorado	observe rodent test

Outdoor Classroom

environmental education guide

SHERBURNE NATIONAL WILDLIFE REFUGE



- Stop 1** AN OLD FARM SITE
- Stop 2** BREEDING FLOCK OF GEESE
- Stop 3** ARTIFICIAL NESTING POND
- Stop 4** NATURAL POND
- Stop 5** WATER IMPOUNDMENT

TOUR SERIES - GUIDE NO.1



Why this refuge

Sherburne National Wildlife Refuge was created under national laws and policy on May 18, 1965. Money from the sale of Duck Stamps (a permit required to hunt migratory birds) was used to purchase 30,000 acres of low, wet land along the St. Francis River in Sherburne County. The refuge is managed by the U.S. Fish and Wildlife Service, Department of the Interior.

Refuges such as Sherburne are continuously being created throughout the United States. Refuges provide habitats, or an acceptable place to live, for many kinds of plants and animals. Plant and animal habitats are becoming scarce because of large numbers of people and their use of the land.

This refuge is managed to provide habitat for water birds--mainly geese and ducks. Rain and snow-water is collected behind earth dams and barriers to make one-third of this area into marshland. This land was woods and marsh before it was farmed. Now it will be suited for water birds again. With careful management, this refuge will help restore some of the decreasing wildlife populations.

Waterfowl

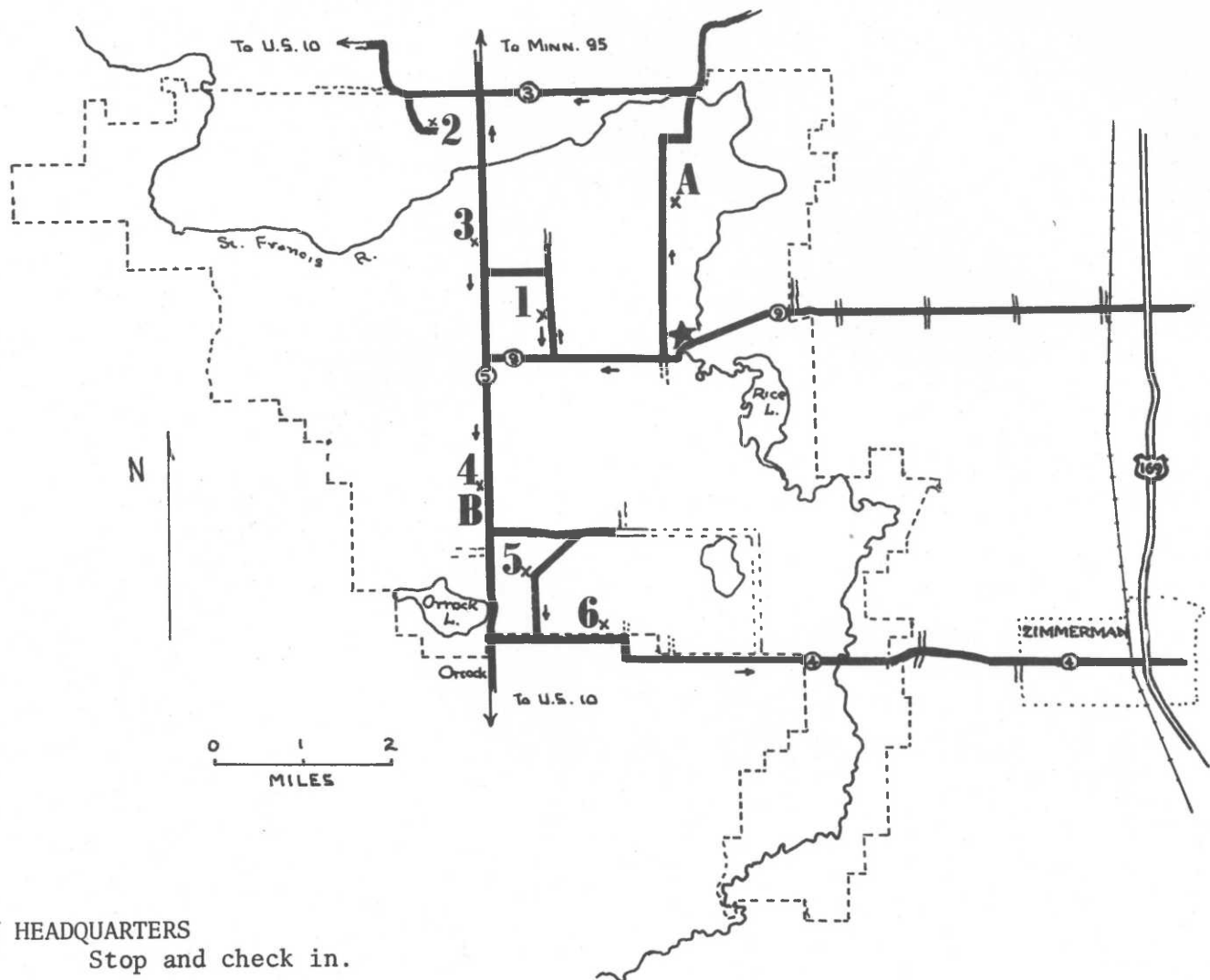
More than one-half of the ducks in North America reproduce on lands cross-hatched on this map. This is the "Prairie Pothole Country." Potholes are water-filled depressions formed by glaciers.

Ducks find mates on these potholes. They also use them as resting areas and for hiding from intruders. Part of a duck's food comes from these ponds as well as from dry land. Insects, seeds and plants are important foods eaten.

As seasons change, ducks and geese fly north and south along the river valleys (indicated by the arrows), resting and feeding in the marshes along the way.



SHERBURNE NATIONAL WILDLIFE REFUGE



★ HEADQUARTERS
Stop and check in.

TOILETS are 1/2 mile east of headquarters.

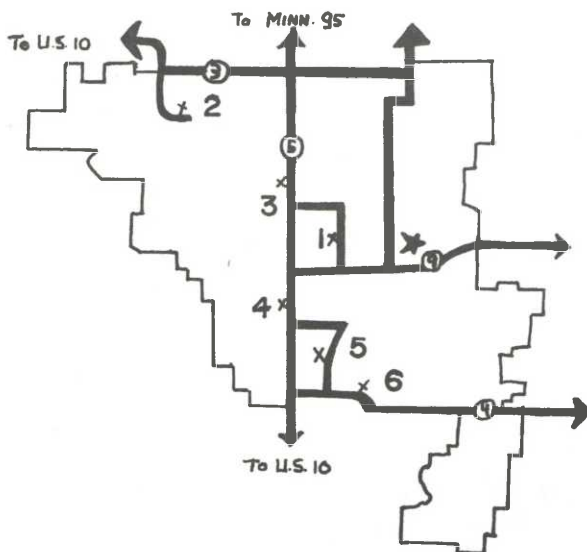
OBSERVE signs which look like this:



Ask the group leader which stops or sites will be visited and in which order. There is a parking place or turn-around for 40 ft. buses at each stop or site.

The group leader should have a rough idea of how long the trip will take. Most trips are about 2 hours.

There is some restricted and some private land within the refuge. Please use the land adjacent to education stops and sites.



Headquarters Stop and register for your group. (You should make a tour reservation by phone before starting your trip.) A record of your visit will be kept to better help you when you visit again.

Toilets are 1/2 mile east of headquarters. Drinking water is available at headquarters.

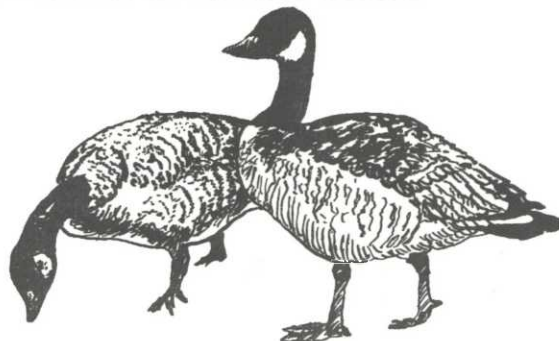
How to proceed A separate map is provided for the driver. There is a parking place or turn-around at each location.

The tour will take about 2 hours.

After the tour You may want to think further about some of the things you experienced. There are some suggestions on the last page for extending these experiences.

STOP NO.1 OLD FARM SITE (15 MINUTES)

A farm was located here because the basic requirements for keeping things alive were present such as fertile soil and moisture. Some trees and grass were cleared so that such special plants as corn, hay and oats could be produced in abundance. Domestic animals including cows and horses were raised. Many natural things were changed. Many different kinds of wild things gave way to the few that were encouraged. Now the farm is gone. The intense farming of the land has stopped. Look about. What is happening now? Can you decide where various farming activities were practiced--crop growing, storing feed for winter, pasturing, living space for people and paths for transport of animals? Which is the more valuable condition--farmed or natural state?



STOP NO.2 BREEDING FLOCK OF GEESE (15 MINUTES)

This is a goose farm. By intensive management, the growth of geese is encouraged and they are produced in greater numbers than in a wild state. The geese are fed corn and other grain.

The geese that are raised here are from a giant strain which is larger than the normal Canada goose. This giant strain has almost disappeared in the wild state. Each year the young of these captive geese are set free in hopes that they will find enough wetland habitat to re-establish a wild population of giant Canadas.

STOP NO.3

ARTIFICIAL NESTING POND (15 MINUTES)

Wildlife is decreasing because there is less and less place for it in man's managed habitats--farms, towns, industries, parks. Dirt was wanted for the road. It was scooped with machines during the dry, late summer. At the same time this pond was created to provide more places for waterbirds. The islands are for nesting. There the nests are better protected from skunks, foxes, and raccoons. Wild grasses have been planted in the field behind the pond so that their seed can provide food for birds and other animals.

The opening in the marsh just down the road was made by blasting with explosives. Openings in vegetation increase the variety of habitats for wildlife.

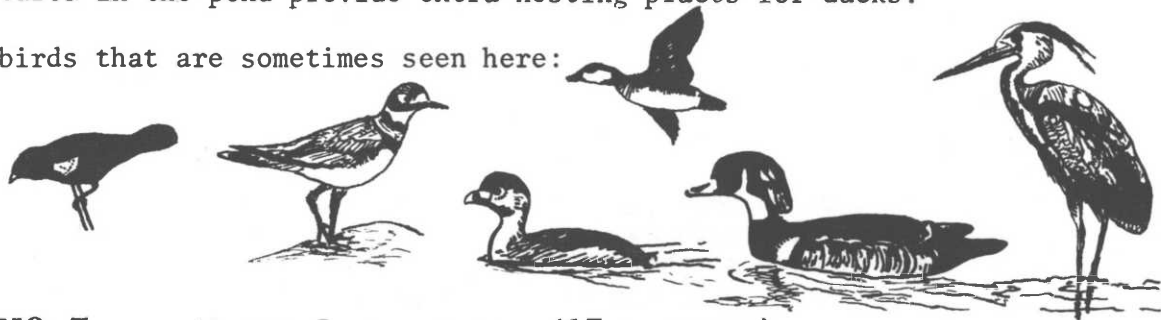
Hunting of waterbirds is allowed in this area in the fall when the birds are migrating through Sherburne toward the south.

STOP NO.4

NATURAL POND (20 MINUTES)

Natural ponds are often drained to make farm land for corn or wheat. However, this pond remained, even though this area was once a farm. This pond has provided a habitat for water animals for hundreds of years. Count the muskrat houses and multiply by 5 to estimate the number of muskrats living here. Muskrats feed partly on cattail roots and stems. Do they have food here? The basket-like structures in the pond provide extra nesting places for ducks.

Waterbirds that are sometimes seen here:



STOP NO.5

WATER IMPOUNDMENT (15 MINUTES)

Another way to make ponds and wetland is to dam small waterways. Snow and rain water collects in this small valley behind the earth dam. Before damming, this valley looked like the area across the road.

Compare the soil in the field to the soil on top of the dam. The field soil is the result of farming on material left by the glaciers. The soil on the dam is material scraped up from the bottom of the valley. It is peat, which is the material left by hundreds of years of dead plants falling into water or wet ground.

STOP NO.6

TORNADO DAMAGE IN 1969 (OPTIONAL - 15 MINUTES)

Man changes habitats. But so do other environmental forces. This oak woods was awesomely changed by wind in 1967. In one or two hundred years this area may become the same kind of oak woods again. Fire, flood, or drought can cause changes like this too.

Think About This

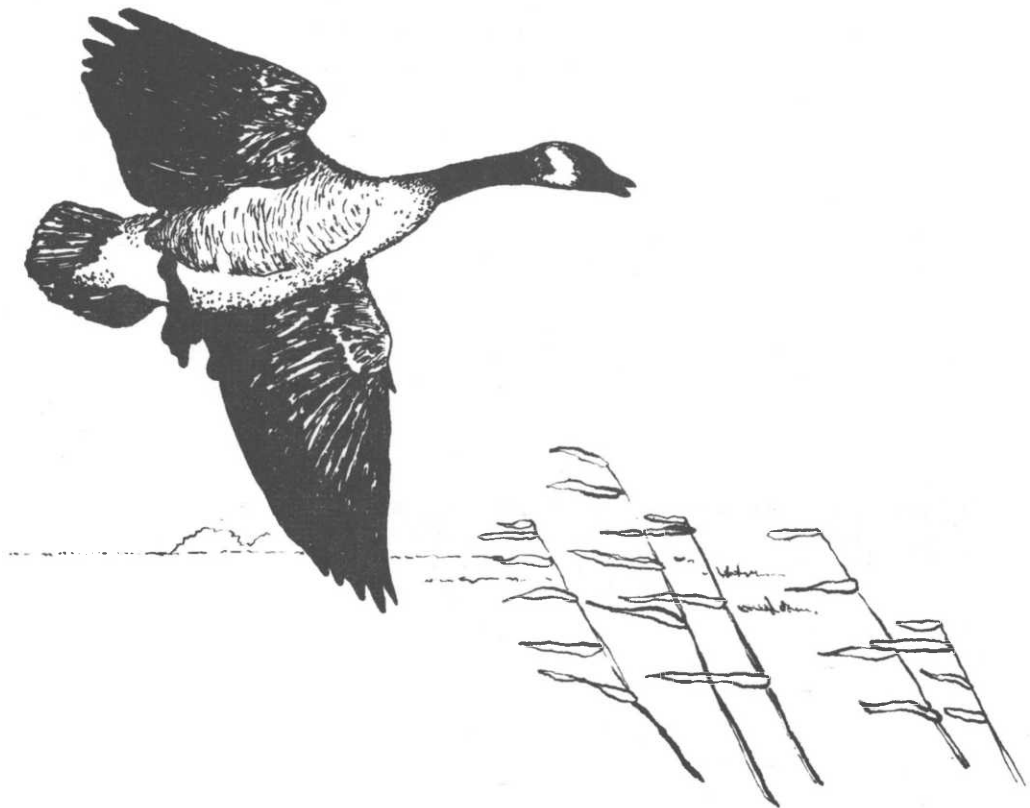
Have you seen other pond habitats? What is happening to them? Student investigation can be extended on this theme. Try ERC lesson materials: "The Role of Living Things" and "Man's Effect on the Environment"; Unit 6 of the Minnesota Environmental Education Pilot Curriculum; and the Fifth and Sixth Grade Social Studies Ideas. For a bibliography of these and other environmental education materials, contact your refuge manager.

OTHER OUTDOOR CLASSROOM GUIDES ARE AVAILABLE FROM YOUR REFUGE MANAGER.

Outdoor Classroom

environmental education guide

SHERBURNE NATIONAL WILDLIFE REFUGE



Stop 1 AN OLD FARM SITE
To promote discussion about raising geese.

Stop 2 BREEDING FLOCK OF GEESE

Stop 4 NATURAL POND
And a field of natural food for animals.

Stop 5 WATER IMPOUNDMENT
A place to consider raising geese in a "wild-state."

TOUR SERIES - GUIDE NO.2



Why this refuge

Sherburne National Wildlife Refuge was created under national laws and policy on May 18, 1965. Money from the sale of Duck Stamps (a permit required to hunt migratory birds) was used to purchase 30,000 acres of low, wet land along the St. Francis River in Sherburne County. The refuge is managed by the U.S. Fish and Wildlife Service, Department of the Interior.

Refuges such as Sherburne are continuously being created throughout the United States. Refuges provide habitats, or an acceptable place to live, for many kinds of plants and animals. Plant and animal habitats are becoming scarce because of large numbers of people and their use of the land.

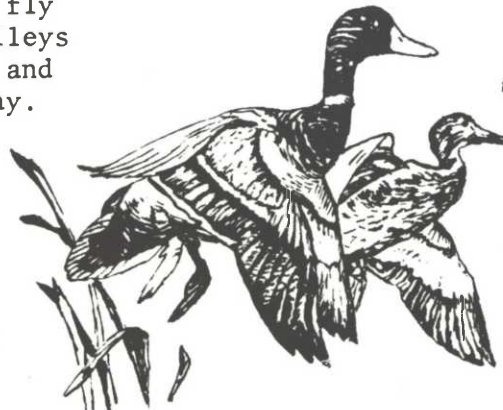
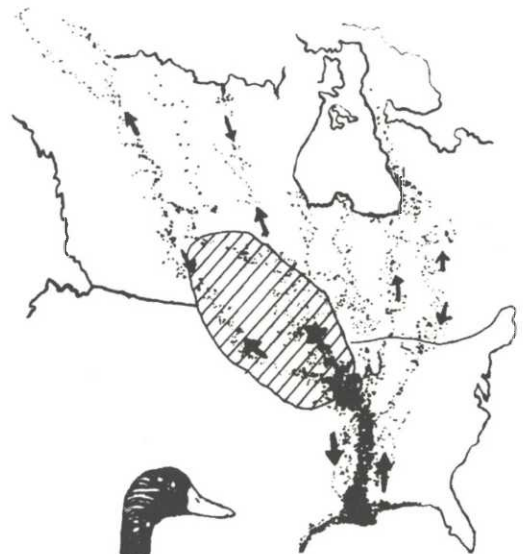
This refuge is managed to provide habitat for water birds--mainly geese and ducks. Rain and snow-water is collected behind earth dams and barriers to make one-third of this area into marshland. This land was woods and marsh before it was farmed. Now it will be suited for water birds again. With careful management, this refuge will help restore some of the decreasing wildlife populations.

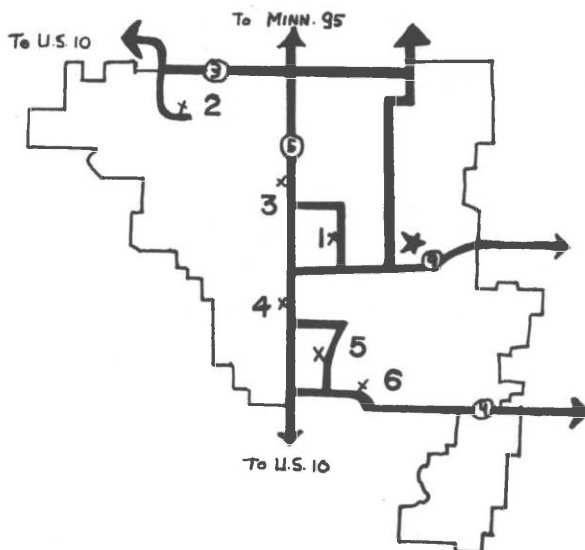
Waterfowl

More than one-half of the ducks in North America reproduce on lands cross-hatched on this map. This is the "Prairie Pothole Country." Potholes are water-filled depressions formed by glaciers.

Ducks find mates on these potholes. They also use them as resting areas and for hiding from intruders. Part of a duck's food comes from these ponds as well as from dry land. Insects, seeds and plants are important foods eaten.

As seasons change, ducks and geese fly north and south along the river valleys (indicated by the arrows), resting and feeding in the marshes along the way.





Headquarters Stop and register for your group. (You should make a tour reservation by phone before starting your trip.) A record of your visit will be kept to better help you when you visit again.

Toilets are 1/2 mile east of headquarters. Drinking water is available at headquarters.

How to proceed A separate map is provided for the driver. There is a parking place or turn-around at each location.

The tour will take about 2 hours.

After the tour You may want to think further about some of the things you experienced. There are some suggestions on the last page for extending these experiences.

STOP NO.1 OLD FARM SITE (15 MINUTES)

A farm was located here because the basic requirements for keeping things alive were present such as fertile soil and moisture. Some trees and grass were cleared so that such special plants as corn, hay and oats could be produced in abundance. Domestic animals including cows and horses were raised. Many natural things were changed. Many different kinds of wild things gave way to the few that were encouraged. Now the farm is gone. The intense farming of the land has stopped. Look about. What is happening now? Can you decide where various farming activities were practiced--crop growing, storing feed for winter, pasturing, living space for people and paths for transport of animals? Which is the more valuable condition--farmed or natural state?

The farmer who lived here raised tame geese. He had about 25 of them. He raised them to sell for food and some he ate himself. He finally stopped raising geese because he could not sell them for enough money to cover the cost of raising them. He had to feed them and protect them from bad weather and from animals that would eat them.

If you were going to raise geese to make money, how would you do it? Look around; how would you feed them, where would you keep them, how would you protect them? Collect ideas from others before you leave here.

STOP NO.2 BREEDING FLOCK OF GEESE (15 MINUTES)

This is a goose farm. By intensive management, the growth of geese is encouraged and they are produced in greater numbers than in a wild state. The geese are fed corn and other grain.

The geese that are raised here are from a giant strain which is larger than the normal Canada goose. This giant strain has almost disappeared in the wild state. Each year the young of these captive geese are set free in hopes that they will find enough wetland habitat to re-establish a wild population of giant Canadas.

STOP NO.4

Natural ponds often are drained to make new cropland for corn or wheat. However, this pond was protected even though this area was once a farm. Count the muskrat houses and multiply by 5 to estimate the number of muskrats living here. Muskrats feed on plants including the roots and stems of cattails. Do they have food here? The basket-like structures in the pond provide extra nesting places for ducks and geese.

The field to the west of this pond has been planted with food plants for ducks and geese. The field looks like it is full of weeds, but these plants and their seeds provide natural food for geese and many other animals. Walk into the field and see if you can find anything that can be eaten.

STOP NO.5

Another way to make ponds is to dam small waterways and valleys to catch water. Earth dams properly located create excellent homes for ducks and other animals. Before damming, this valley was similar to the area across the road.

Compare the soil in the field to the soil on top of the dam. The field soil is the result of farming and materials left by glaciers. The soil on the dam is material scraped up from the bottom of the valley. It is peat which is partially decomposed plant material.

Stop awhile to reconsider how you might raise geese. Would you do it for money?

Remember that when raising geese in a natural way or in the "wild-state" you will not be able to keep all of them for yourself. Animals will eat some, some will die in storms, and some will fly away and never return. Do you suppose that it is really worthwhile to raise geese in a "wild-state?"

STOP NO.6

Man changes most natural things including animal and plant habitats. Other forces change plant and animal habitats, too. Many years from now, this oak forest will recover from nearly complete destruction by wind. Fire, flood or drought can have similar influences.

THINK ABOUT THIS

Refuges, farmland and cities are man dominated habitats. How is this domination different in the three locations? Use NWF booklet, "Man's Habitat - The City;" Minnesota EE Pilot Curriculum Unit 3 and Unit 11; NEED Math 1 and 2 and Science 1 for ideas of ways to describe man dominated habitats. For a bibliography of these and other environmental education materials contact your refuge manager.

OTHER OUTDOOR CLASSROOM SERIES ARE AVAILABLE FROM THE REFUGE MANAGER.

Outdoor Classroom

environmental education guide

SHERBURNE NATIONAL WILDLIFE REFUGE



Site A Where measurements are made and information is collected. This information will be compared with information from Site "B" to answer the question: Do native plants produce more seed heads?

Stop 2 BREEDING FLOCK OF GEESE

Stop 3 ARTIFICIAL NESTING POND

Site B Final measurements will provide a comparison of information from two different plant populations. Directions for comparing information will allow some conclusions to be reached.



Why this refuge

Sherburne National Wildlife Refuge was created under national laws and policy on May 18, 1965. Money from the sale of Duck Stamps (a permit required to hunt migratory birds) was used to purchase 30,000 acres of low, wet land along the St. Francis River in Sherburne County. The refuge is managed by the U.S. Fish and Wildlife Service, Department of the Interior.

Refuges such as Sherburne are continuously being created throughout the United States. Refuges provide habitats, or an acceptable place to live, for many kinds of plants and animals. Plant and animal habitats are becoming scarce because of large numbers of people and their use of the land.

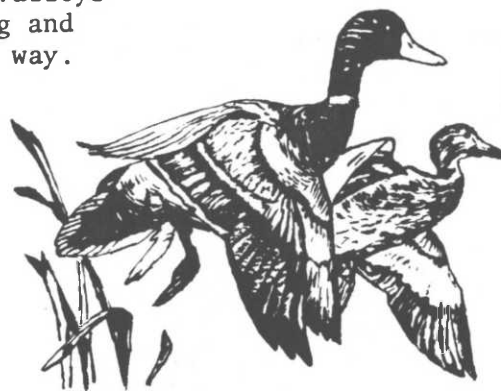
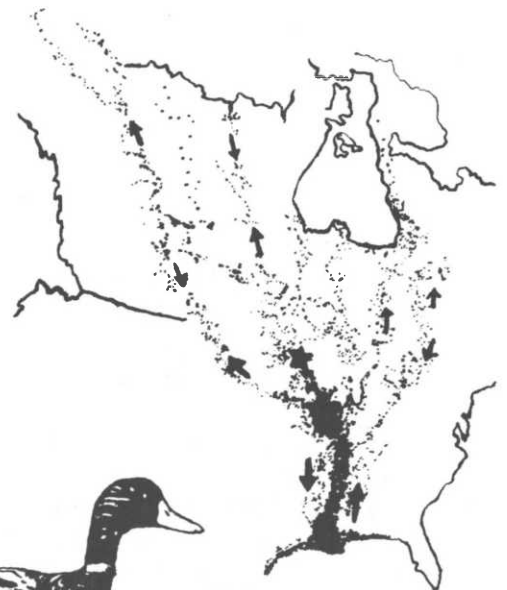
This refuge is managed to provide habitat for water birds--mainly geese and ducks. Rain and snow-water is collected behind earth dams and barriers to make one-third of this area into marshland. This land was woods and marsh before it was farmed. Now it will be suited for water birds again. With careful management, this refuge will help restore some of the decreasing wildlife populations.

Waterfowl

Over one-half of the ducks in North America are produced on lands stippled on this map. This is the "Prairie Pothole Country." Potholes are water filled depressions formed by glaciers.

Ducks find mates on these potholes. They also use them as resting areas and for hiding from intruders. Part of a duck's food comes from these ponds as well as from dry land. Insects, seeds and plants are important foods eaten.

As seasons change, ducks and geese fly north and south along the river valleys (indicated by the arrows), resting and feeding in the marshes along the way.



DATA SHEET

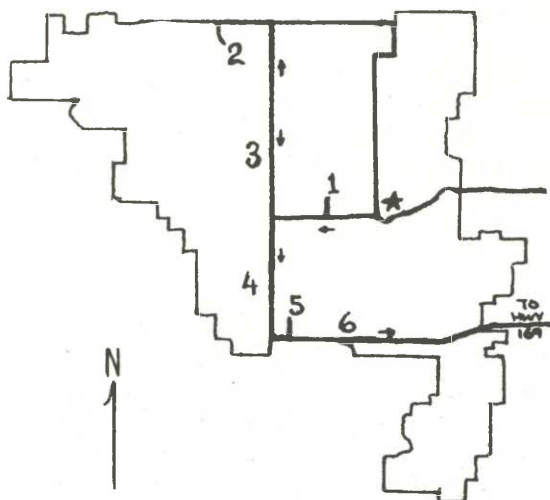
SITE A

	Plot 1	Plot 2	Plot 3	Plot 4
Dry				
Wet				



SITE B

	Plot 1	Plot 2	Plot 3	Plot 4
Dry				
Wet				



★ **Headquarters** Stop and register for your group. (You should make a tour reservation by phone before starting your trip.) A record of your visit will be kept to better help you when you visit again.

Toilets are near headquarters. Drive 1/2 mile east. Drinking water is available.

How to proceed A separate map is provided for the driver.

There is a parking place or turn-around at each location.

The tour will take about 2 hours.

After the tour You may want to think further about some of the things you experienced. There are some suggestions on the last page for extending these experiences.

SITE A

ORGANIZING. Plan to spend up to 45 minutes at Site "A" and "B" marked on the map. At each site you will find four large plots of ground which are marked with flags. Each plot is so located that part of the ground is wet and the other part is dry. At each site, the student is asked to make two counts of the number of seed heads, one in a wet place and one in a dry place, and write this measurement in the appropriate box on the data sheet. Students can take measurements in any order of sequence as long as they understand that all boxes on the data sheet should be filled for Site "A" and then later for Site "B". To insure uniform results at the end of study, do not have all students follow the same sequence, i.e., start at plot one and proceed to plot 4. It is possible for students to work in teams of two.

TECHNIQUE. Students will count the total number of seed heads from any kind of plant in an area of ground approximately as big as the data sheet they have in their hand. Illustrations show a sample of seed heads.

COMMON PROBLEMS. It is not necessary that the "data-sheet-size" counting area be perfectly exact, nor is it critical if a student wrongly identifies some other structure as a seed head. The results of this study is based on a statistical average of all students' measurements. Many seed heads may occur which are not pictured, some pictured may not be found at different seasons of the year. Some seeds may be found on the ground, some on tall plants overhead. These count too. Some students may not finish in time. Their incomplete data sheets will not affect the study as long as the group has measured plots randomly.

COLLECTING DATA - USING STUDENT DATA SHEETS. Copy the printed data sheet. Each student will need a copy of the data sheet and a pencil. It is possible for students to work in teams of two. Students should write only a number in each square of the data sheet.

EXPECTED AND POSSIBLE RESULTS. Individual student counts of seed heads from each area may range from 0 to several hundred. A more likely range is 3 to 25. Results will differ between students and plots.

This is a Goose Farm. By intensive management, growth of geese is encouraged and they are produced in greater numbers than in a wild-state. The geese are fed corn and other grain.

The geese that are raised here are from a giant strain which is larger than the normal Canada goose. This giant strain has almost disappeared in the wild-state. Each year the young of these captive geese are set free in hopes that they will find enough wetland habitat to re-establish a wild population of giant Canadas.

STOP NO. 3 ARTIFICIAL NESTING POND (15 MINUTES)

Wildlife is decreasing because man's construction of highways, industries and houses, and intensive farming have destroyed its habitat. Dirt was needed for this road. It was scooped with machines during the dry late summer. At the same time this pond was created to provide more places for water birds. The islands are for nesting. Island nests are better protected from skunk, fox and raccoon. Wild grasses have been encouraged in the field behind the pond so that their seeds can provide food for many animals.

The opening in the marsh just down the road was made by blasting with explosives. Openings in vegetation increase wildlife use.

SITE B

BACKGROUND INFORMATION. This site has been artificially planted. Site "A" was growing in a "wild state." But there is an interesting distinction here. Site "A" was farm land just as Site "B" was. The original "wild" native grasses were forced out by introduced plants of farming practice. Many of these grasses introduced by the farmers continue to grow in Site "A" where the land has now been allowed to lie untouched. Site "B" is being planted and managed (farmed in a way) to encourage the growth of the original native plants. In a sense then, Site "B" is more "wild" than Site "A" because it is being managed with native grasses that were here before the farms.

COLLECTING DATA. Repeat the procedure from Site "A".

MAKING ASSUMPTIONS FROM THE DATA

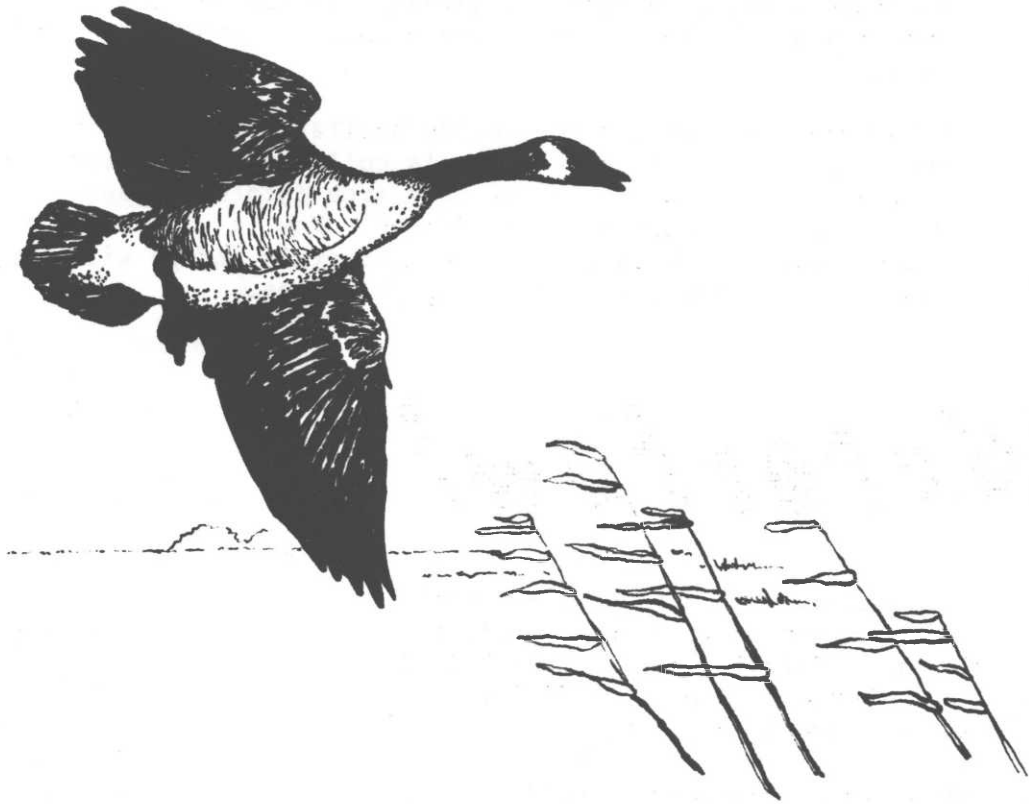
To answer the question: "Do native plants produce more seed heads than introduced plants?" Individual data sheets may show a difference between Site "A" and Site "B" or between wet and dry ground. It is interesting for students to speculate on conclusions from their separate data. Especially in that many of their data sheets will conflict in the differences they show.

Statistically, the information on one data sheet is not a valid sample of the plants being counted. It is not a large enough sample. But if several students or an entire class sampled the plants, the information can be pooled into a large, valid sampling. Use a blank data sheet and write in the total from all individual data sheets for each box. If this is done on an overhead transparency or enlarged wall chart of the data sheet, all participants can see the results at once. Now is there any indication of an answer to the question above? Are there more seed heads in the wet or the dry area? If you find an answer, it would be generous of you to let your refuge manager know your group's data and conclusions. He is trying to find the answer to this question too.

Outdoor Classroom

environmental education guide

SHERBURNE NATIONAL WILDLIFE REFUGE



Site C-D An investigation in snow depth and snow-water content to try to answer the question: What kind of location collects the greatest amount of snow-water?

Stop 2 Observe a breeding flock of geese.

Stop 3 Observe an artificial nesting pond.

ACTIVITY SERIES - GUIDE NO. 10



Why this refuge

Sherburne National Wildlife Refuge was created under national laws and policy on May 18, 1965. Money from the sale of Duck Stamps (a permit required to hunt migratory birds) was used to purchase 30,000 acres of low, wet land along the St. Francis River in Sherburne County. The refuge is managed by the U.S. Fish and Wildlife Service, Department of the Interior.

Refuges such as Sherburne are continuously being created throughout the United States. Refuges provide habitats, or an acceptable place to live, for many kinds of plants and animals. Plant and animal habitats are becoming scarce because of large numbers of people and their use of the land.

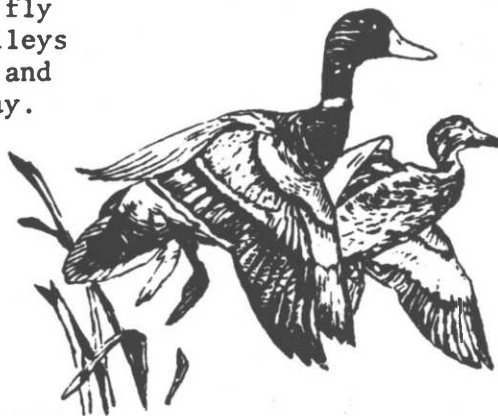
This refuge is managed to provide habitat for water birds--mainly geese and ducks. Rain and snow-water is collected behind earth dams and barriers to make one-third of this area into marshland. This land was woods and marsh before it was farmed. Now it will be suited for water birds again. With careful management, this refuge will help restore some of the decreasing wildlife populations.

Waterfowl

More than one-half of the ducks in North America reproduce on lands cross-hatched on this map. This is the "Prairie Pothole Country." Potholes are water-filled depressions formed by glaciers.

Ducks find mates on these potholes. They also use them as resting areas and for hiding from intruders. Part of a duck's food comes from these ponds as well as from dry land. Insects, seeds and plants are important foods eaten.

As seasons change, ducks and geese fly north and south along the river valleys (indicated by the arrows), resting and feeding in the marshes along the way.



DATA SHEET

Activity Series - No. 10

DATE _____

TEAM _____

SITE C

LOCATION 1 - OAK WOODS

Snow Depth

Water Content

LOCATION 2 - OPEN FIELD

Snow Depth

Water Content

SITE D

LOCATION 3 - MEADOW

Snow Depth

Water Content

LOCATION 4 - DENSE CONIFER PLANTATION

Snow Depth

Water Content

LOCATION 5 - OPEN CONIFER PLANTATION

Snow Depth

Water Content

Stop and register for your group. (You should make a tour reservation by phone before starting your trip.) The tour will take about 2 hours. A map is provided

SITE C and D MEASURING SNOW

Snow at Sherburne Refuge provides about 15% of the 29 inches average yearly precipitation as measured in inches of water. About 5 or more inches of snow will yield an inch of water when melted.

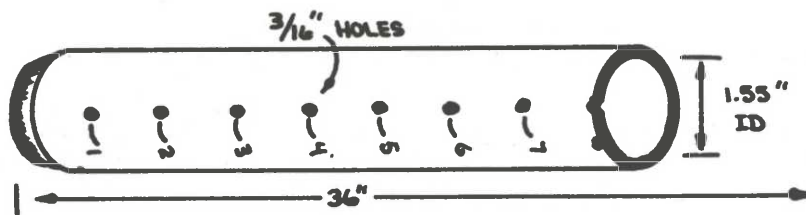
Water impoundment is one of the major management tools used to maintain an environment for waterfowl. This is particularly important in spring when birds are mating and when water plants and other populations are beginning to reproduce again.

An understanding of how melting snow will affect the amount of water in the soil or in streams and ponds is important for capable environmental management. This investigation will give students a way of determining the water content of snow, and a way of comparing the amount of snow-water in one location to another.

These skills are practiced in the attempt to solve the problem: WHAT KIND OF LOCATION COLLECTS THE GREATEST AMOUNT OF SNOW-WATER?

The tool - A Snow Tube

Obtain a 3 foot length of 1-7/8 inch plastic drain pipe (plumbing or hardware store) for each team of 3 or 4 students. Bevel the edge at the bottom end. Mark off one inch intervals starting from the bottom and drill 3/16 inch holes at each mark.



Technique

1. Snow depth. Thrust the tube vertically into the snow. Be sure to touch ground level. Record the actual snow depth from the calibration on the tube.
2. Water content. The more snow the more water, of course. But some snow is denser than other snow. Dig down the side of the tube and carefully slide your hand, card or a shovel under the tube to hold the snow in. Brush away excess snow, then dump the snow from the tube into a plastic bag (one small garbage bag needed for each measurement a team makes). Mark the bag with the site number or location.

Later the snow can be melted and the volume of water measured. Measure with a graduated tube or you can determine the depth of this volume of water--that is, how high would the water stand in the measuring tube.

One inch depth within a tube having a 1.55 inch diameter would equal a volume of 1.89 cubic inches or 30.9 (31) milliliters ($\text{vol.} = R^2H$). So the depth of melted snow-water would equal its volume in cubic inches divided by 1.89 or its volume in milliliters divided by 30.9. (One fluid ounce = 1.8 cubic inches = 29.6 milliliters).

Or you can calculate the volume of water per square foot, per acre or whatever. The tube covers 4.87 square inches or about 1/30 of a square foot. This means that about 30 times the water volume measured in a tube full of snow will equal the volume of snow-water sitting on one square foot of ground.

Pooling Data

There is great advantage in several teams of students pooling or averaging their measurements. The statistical validity of the investigation is increased by smoothing out the variation in individual samples.

Assumptions and conclusions are most validly made by the whole class of students upon the results of the pooled data.

Where to Make Sample Measurements

Five locations have been marked on the map for taking measurements:

Site C

- Location 1 - Oak Woods
- Location 2 - Open Field

Site D

- Location 3 - Meadow
- Location 4 - Dense Conifer Plantation
- Location 5 - Open Plantation

Decide what units of measurement you will use. Then record all measurements on data sheets and label all sample bags.

Pool the Results

Compare measurements from the different locations. Can students make any assumptions about ways to control the amount of snow-water which accumulates on the land? What kinds of management would be best if more water were wanted in the spring?

To help your refuge manager with some similar studies he is making, send him a copy of your pooled data and the conclusions the students can draw from this data.

Think about extending this investigation. Refer to SCIS unit "Phases of Matter" and "Systems and Subsystems", ESS "Ice Cubes" and "Stream Tables", NWF "Snow and Ice" and "Soil Sampling - Water Holding Capacity" and various investigations from IPS and ESCP. These and other references are obtainable from your Refuge Manager.

Stop 2 BREEDING FLOCK OF GEESE (15 MINUTES)

This is a Goose Farm. By intensive management, growth of geese is encouraged and they are produced in greater numbers than in a wild-state.

The geese that are raised here are from a giant strain which is larger than the normal Canada goose. This giant strain has almost disappeared in the wild-state.

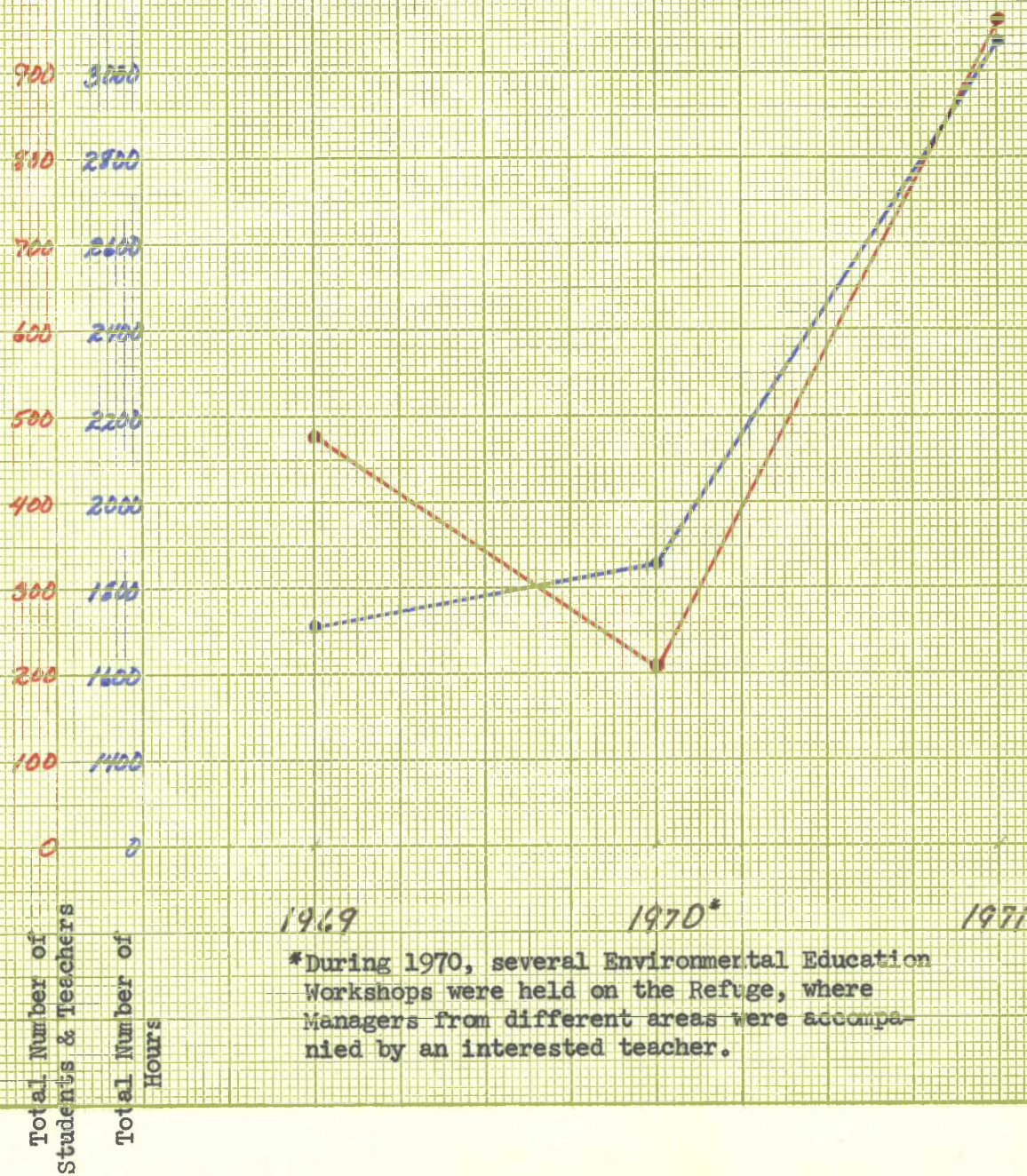
Stop 3 ARTIFICIAL NESTING POND (15 MINUTES)

Wildlife is decreasing because man's construction of highways, industries and houses, and intensive farming have destroyed its habitat. Dirt was needed for this road. It was scooped with machines during the dry late summer. At the same time this pond was created to provide more places for water birds. The islands are for nesting. Island nests are better protected from predators.

Availability of water (at least in spring) is essential to maintain these nesting and feeding sites.

OTHER OUTDOOR CLASSROOM GUIDES ARE AVAILABLE FROM YOUR REFUGE MANAGER.

Environmental Education Progress



1969

1970*

1971

*During 1970, several Environmental Education Workshops were held on the Refuge, where Managers from different areas were accompanied by an interested teacher.

Date	Name & Organization	Purpose
8/10	Dwight McCurdy, C.O. Washington	Public Use Survey
8/10	Stephen L. Palmer, U.S. Attorney	Land Acquisition
8/10	Elmer T. Nitzschke, Field Solicitor	" " "
8/10	Tom French, Dept. of Justice, Atty.	" " "
9/21	Mr. & Mrs. Travis Roberts, R.O., Mpls.	Orientation visit
11/3	Con Christianson, D.N.R. (Minnesota)	Courtesy visit
11/13	Robert W. Burwell, BSF&W (Retd.)	Visit
11/15	Robert A. Peoples, BSF&W C.O. Washington	Discuss Ref. program

Many visits were recorded during the year from representatives of the Department of Natural Resources, State of Minnesota. Regional Office personnel were frequent visitors both on business and for personal enjoyment.

D. Refuge Participation

Refuge personnel again assisted the Minnesota Department of Natural Resources with snowmobile safety training during the winter months.

Slide/film talks were given on 24 occasions with a total of 1,825 people in attendance. Sixteen landscape architecture students from the University of Minnesota toured the Refuge and made recommendations for possible development of the area for public use. Final reports and illustrations were prepared and several stimulating and novel approaches were presented. Manager Yoder and Assistant Manager Drieslein were on hand at the Scout Camporee at Camp Ripley, Minnesota on May 22 with the Bureau Wetlands Display and live geese from our display flock. About 1,000 scouts attended.

A Conservation Field Day for 1100 students from elementary schools in Sherburne, Benton and Mille Lacs counties was held at the Refuge on October 19 and 20.

E. Hunting

Three major changes were made in the Refuge hunting programs this year.

1. Minnesota had no firearms deer season. ✓
2. The Refuge was closed to goose hunting.
3. Approximately 60% of the Refuge was closed to all waterfowl hunting.

This resulted in three classifications of land as far as hunting was concerned: an area which was completely closed; an area open for hunting resident game only; and an area open for all hunting except geese.

From a basically wide open hunting area for the past few years, this was quite a change, but surprisingly few problems developed.

Six Refuge people were in the field on waterfowl opening, talking to hunters and explaining the regulations. We believe this eased the transition considerably.

1. Waterfowl The season opened at noon, October 2, with approximately 5,000 ducks and 250 hunters. Although 40% or some 12,000 acres was posted as open to duck hunting, the actual huntable area was limited to the lower St. Francis River and two small lakes, or about 500 acres. This section of the river normally receives little waterfowl use. After the second day, the two lakes received no waterfowl use. Total kill for the season is estimated at less than 100 birds. We feel the whole show left much to be desired.

2. Upland Game Hunting pressure on ruffed grouse was heavy again this year, due in part to the lack of opportunity for waterfowl hunting and the closure of the firearms deer season. The continued development of pull-offs and woodland trails has improved access to most of the good grouse habitat within the refuge. Hunter success on the average is rather low (less than 1 bird per hunter on opening weekend), however, most people are satisfied with flushing a few birds and enjoying a day in the woods.

Squirrel hunting was a popular sport in this area several years ago, but current demand is rather low. There is certainly no shortage of squirrels - both the fox and gray types are common, and the unprotected red squirrel is extremely abundant.

Hunting for rabbits on the Refuge is about like watching submarine races - even the owls can't find any. We won't be accruing many RBU's from this activity for some time.

3. Big-game Minnesota closed the season on deer hunting with firearms this year. During the bow season, two hunters reported taking deer within the refuge boundary.

F. Violations

Ten violations were processed through local court:

<u>Name & Address</u>	<u>Charge</u>	<u>Disposition</u>
Scott Peterson, Crystal, Minn.	Waterfowl Hunting in closed area	10 + 4
	Unplugged shotgun	10 + 4
Name & address unavailable	Littering	25 + 4
Gary Nesenson, Mpls., Mn.	Late shooting	10 + 4
Theodore Nagorski, Big Lake, Mn.	Late shooting	15 + 4
Bruce Jacobsen, Zimmerman, Mn.	Late shooting	10 + 4

Name & Address	Charge	Disposition
Bradley Roden, Mpls., Mn.	Attempt to take protected bird (Sparrow hawk)	10 + 4
Dennis Dwerr, Mpls., Minn.	Attempt to take protected bird (Sparrow hawk)	10 + 4
Robert Paige, Crystal, Mn.		** 10 + 4
Ronald Splett, Mpls., Mn.		** 10 + 4
James Rueter, St. Cloud, Mn.		** 10 + 4

**Three separate cases, all charged with unauthorized travel with motor vehicle for the purpose of hunting. In simple terms, off the road driving.

Title 50 CFR is quite specific in prohibiting this and many other similar activities, but try to get this type of violation into Federal Court. Minnesota Fish and Game laws will cover Refuge regulations dealing specifically with hunting and fishing, so we went to court with three.

We took information on twelve additional trespass and nineteen shooting violations (target shooting and plinking), which did not involve hunting or fishing. Ten juvenile cases ranging from trespass to late shooting were not filed on.

Our two temporary weekend employees were instructed to record license numbers of unoccupied vehicles found parked off the road. On the theory that a letter with the individuals name and address would make more of an impression than a "no-no" card on the windshield, we checked the numbers through the Highway Patrol, and sent this attached letter to 18 people. What domestic problems developed as a result, we do not know. However, we received no complaints and found no repeaters.

F. Safety

Each member of the staff selected a topic and presented a SAFETY meeting during the year. Subjects ranged from household hazards to heavy equipment safety. We lost our "No lost time record" this summer when a maintenance man strained his back while carrying one end of a 4'X8" piece of sheet rock. Current standing is 203 days without a lost time accident.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
SHERBURNE NATIONAL WILDLIFE REFUGE
Box 158
Princeton, Minnesota 55371

IN REPLY REFER TO:

Off-the-road driving is prohibited on all National Wildlife Refuges, except in areas specifically set up for this purpose. Maps are available at the Sherburne National Wildlife Refuge Headquarters, and at Refuge Information Stations, showing roads and parking areas where motor vehicle use is authorized.

On _____, a vehicle registered to you was found parked outside of these designated areas. We ask your cooperation in learning and complying with all refuge regulations. Future violations of this sort will be prosecuted.

Sincerely,

Robert G. Yoder
Refuge Manager

VII. OTHER ITEMS

A. Items of Interest

1. Personnel Sherburne was very fortunate indeed this year when Miss Karen Smith was added to our permanent staff with the impressive position title of Public Use Specialist (Illustrator) on May 16, 1971. Many of the Region 3 people know Karen personally and others by her work, but for those who do not we submit this brief thumbnail sketch of her career to date. Karen came to the Sherburne Refuge by way of the Regional Office where she was a staff specialist for the past two years. Prior to this she had worked at Seney for several summers and did an outstanding job of illustrating some of the displays in Seney's Visitor Center. Before this Karen was completing her studies at Michigan State University where she received her B.S. in Wildlife Management.

Of the many honors Karen has received, I am sure one she will always remember is that of being presented with the Civil Servant of the Year Award by the Bureau of Sport Fisheries and Wildlife and hosted by the Federal Executive Board of Minneapolis-St. Paul on June 23 in the Twin Cities. The entire staff of the Sherburne is happy to have Karen working with them.

Another welcome addition to our permanent staff is that of Merlin Wicktor who was converted to career status on June 27, 1971. Merlin has been with the Refuge since 1967 in one type of classification or another and is now filling the position of Engineering Equipment Operator. Merlin has worked with and been in the heavy equipment construction business most of his adult life and spent several years working on the Alcan Highway into Alaska. He fills a void on our staff which was critically felt but now very adequately filled due to his vast experience and training.

Milton C. Elveru who had worked for the Sherburne Refuge as it's first wage board employee since 1966 informed the Refuge that due to Doctor's orders he would not be able to continue in his present position. "Milty" had been doctoring for some time and fighting to keep active but he always performed his tasks efficiently and in a very satisfactory manner. Milt sold his farm to the Bureau and our staff moved in and made it our Maintenance Shop and sub-Headquarters. His job as patrolman brought him in contact with many people yet no one has ever been heard to utter an unkind word about him. Truly he is being missed by staff and wildlife alike.

Our summer staff once again handled many people and problems alike and performed outstandingly. Mr. Wayne Harper was with us again this summer as a Biological Technician and concentrated his time with our increasingly heavy public use. He divided his time somewhat between school groups and guided tours while trying to involve as many as our visitors as possible in an Environmental Education experience. During the school year Wayne teaches Biological Science at the Princeton Junior High School.

Kerry Parcel from Aberdeen, South Dakota worked with the Refuge this summer as a Biological Aid. Kerry, a graduate from South Dakota State University at Brookings, divided his time this summer between wildlife census work and banding, and that of assisting with our public use activities. Kerry was a welcome addition to the staff this summer and we hated to see him leave. We were pleased to hear that after his return to South Dakota that he was appointed as a South Dakota Conservation Officer at Britton which is in the north-east corner of the state. We all wish Kerry the very best in his new position.

Doctor John W. Moore, retired Botanist, who had been associated with the University of Minnesota from 1924 to 1970, joined the Refuge staff as a consultant this summer. Dr. Moore who holds the following honors and/or awards has as his major field of study plant taxonomy.

- Shevlin Fellowship, Univ. of Minnesota
- Gamma Alpha, Univ. of Minnesota
- Fellow of the American Geographical Society
- Member of the National Geographical Society
- Member of the American Association of Science
- Life member of the Minnesota Academy of Science
- Sigma Pi Honorary Society
- Fellowship Bishop Museum-Honolulu and Yale University
- American Fern Society
- Honorary Member on the Board of Directors for the Pipestone Society

Dr. Moore collected and identified over 600 species of flowering plants on the Refuge and put together a check list of these plants, ferns and fern allies. We are now involved with labeling and cataloguing this impressive array of plants and filing them in our new herbarium case.

Other employees this summer included Tom Goeritz and Mark Stultz, students from Mankato State College in Minnesota who worked on a public use survey and inventory under the Student Internship program. Their project was based on an inventory procedure developed by Dr. Dwight McCurdy of our Central Office and apparently used on other high public use areas. The following questionnaire was distributed by the students on a pre-determined schedule and route so that the results could be statistically evaluated. The boys were very enthusiastic and a welcome addition to our summer staff.

Dave Goetz and Ron Johanson, students from the Princeton High School worked out a Y.O.C. tenure with the Refuge. These boys spent 10 hours every two weeks working with the Refuge staff on different activities for a complete Refuge indoctrination. After the school year, Dave and Ron worked full time on the Refuge and added greatly to the overall efficiency of the summer staff. These two boys were eager workers and avid wildlifers and we look for them to have a great future in this field.

2. Acquisition On March 18, 1971 condemnation of 20 tract totaling 3,044 acres was instigated and at this time a Declaration of Taking was signed by Earl R. Larson, United States District Judge and served to the Defendants by Federal Marshals. This brought the total acreage now owned, optioned, or under condemnation to 27,937 acres. The State of Minnesota is still holding 1,680 acres of land within the Refuge boundary however, this is in legislature proceedings now and will be only a matter of time until it is transferred by trading land to the Refuge. With this taking place there is only 881 acres more or less that still remains in private ownership. The majority of this remaining private land involves Christmas tree plantations in all stages of development from seedlings to marketable trees and beyond, consequently the asking price is much higher per acre than normal farm or forested land. The Realty Division is working on a way to option the land while allowing the growers to market their trees for differing period of time depending on tract size, age, and composition.

The Refuge was established in May of 1965 and the first land was bought or optioned that year. Individual owners within the approved boundary totaled 267 with the acres acquired as follows:

1965	-	65 Tracts equalling	=	7,272 acres
1966	-	54 Tracts equalling	=	5,572 acres
1967	-	39 Tracts equalling	=	5,004 acres
1968	-	36 Tracts equalling	=	3,945 acres
1969	-	8 Tracts equalling	=	600 acres
1970	-	<u>36 Tracts equalling</u>	=	<u>2,500 acres</u>

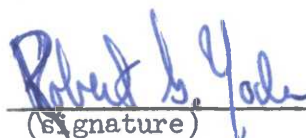
238 Tracts equalling	24,893 acres
----------------------	--------------

Of the 20 tracts which were condemned this year roughly half of the owners have decided to settle out of court. It appears at this time that the court trial will not be held until sometime next summer. It is our hope that we will be able to wind up the tree plantation tracts to co-incide with the completion of the condemnation cases.

Credits and Photographs This year's narrative was a cooperative effort by the Refuge office staff. Manager Bob Yoder wrote Section VII. Soil Conservationist, Homer McCollum wrote sections I-B, III, IV, VI-E thru G and B thru E of Section V. Karen Smith wrote parts A and B of the Public Relations section. Pat Dunham wrote Section I-A and VI-B. All remaining sections were written by Robert Drieslein. The typing was done by the clerk and the editing and assembling was another cooperative venture. Pictures were taken by the Refuge staff and usually the person responsible for the text also supplied the pictures.

SIGNATURE PAGE

Submitted by:



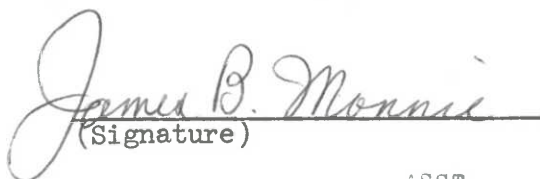
(signature)

Robert G. Yoder

Refuge Manager

(title)Date: MAY 10 1972

APPROVED, Regional Office



(Signature)

ASST

Regional Refuge Supervisor



JAN 72



JAN 72

As part of our continuing effort to provide a meaningful outdoor experience, a variety of targets are available to the Sportsman(?)!



JAN 72



JAN 72

W A - E R F O W L

REFUGE Shattuck

MONTHS OF Jan. 1 TO Apr. 30, 19 71

(1) Species	(2) Weeks of reporting period										Mar 7-10-13
	Jan. 3-9 1	Jan 10-16 2	Jan 17-23 3	Jan 24-30 4	Jan 31-Feb 6 5	Feb 7-13 6	Feb 14-20 7	Feb 21-27 8	Feb 28-Mar 6 9		
Swans:											
Whistling											
Trumpeter											
Geese:											
Canada											
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other											
Ducks:											
Mallard						6					
Black											
Gadwall											
Baldpate											
Pintail											
Green-winged teal											
Blue-winged teal											
Cinnamon teal											
Shoveler											
Wood											
Redhead											
Ring-necked											
Canvasback											
Scaup											
Goldeneye											
Bufflehead											
Ruddy											
Other											
Coot:											

3 -17-9a

Cont. ...-1

(Rev. March 1953)

WATERFOWL (Continuation Sheet)

REFUGE SherburneMONTHS OF January 1 TO April 30, 19 71

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl days use	(4) Production Broods:Estimat seen: total
	Mar 14-20	Mar 21-27	Mar 28-Apr 3	Apr 4-10	Apr 11-17	Apr 18-24	Apr 25-30			
Swans:										
Whistling				190	7				441	
Trumpeter										
Geese:										
Canada		15		190	250	25	40		1796	
Cackling										
Brant										
White-fronted				7	7	1	1		66	
Snow				2		2	2		47	
Blue						14	14		364	
Other										
Ducks:										
Mallard		250		3500	3500	1900	900		37,308	
Black		2							14	
Gadwall				10	10	10			100	
Baldpate				200	250	30			1485	
Pintail		15		3000	3000	300			17,965	
Green-winged teal				90	100	25	25		945	
Blue-winged teal				30	400	900	750		11,103	
Cinnamon teal										
Shoveler				20	100	30	20		828	
Wood		10		5	20	30	40		620	
Redhead					10	10			40	
Ring-necked				500	750	750	750		16,980	
Canvasback				1	100	40			406	
Scaup				2000	12000	1000	500		49,779	
Goldeneye				50	25				230	
Bufflehead				10	25	30	20		416	
Ruddy										
Other										
Common merganser				2	10				12	
Red-breasted merganser				3	2	6			11	
Hooded merganser				15	5				125	
Coot:				1	25	500	750	750	11,961	
				(over)						

	(5)	(6)	(7)
	Total Days Use	Peak Number	Total Production
Swans	<u>441</u>	<u>190</u>	
Geese	<u>2,273</u>	<u>290</u>	
Ducks	<u>138,261</u>	<u>20,307</u>	
Coots	<u>11,961</u>	<u>750</u>	

SUMMARY

Principal feeding areas Rice Lake, flooded millet fields
and wet meadows

Principal nesting areas _____

Reported by Robert L. Drieslein

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

W A E R F O W L

REFUGE Sherburne

MONTHS OF May 1 TO August 31 19 71

(1) Species	(2) Weeks of reporting period									
	May 1-8	May 9-15	May 16-22	May 23-29	May 30-June 5	June 6-12	June 13-19	June 20-26	June 27-July 3	July 4-10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada	25	20								
Cackling										
Brant										
White-fronted	1	1	1							
Snow	2	2	2							
Blue	15	15	15							
Other										
Ducks:										
Mallard	400	250	250	250	250	300	300	350	400	400
Black										
Gadwall										
Baldpate	10	10	10							
Pintail										
Green-winged teal	50	20	20	20	20	20	30	30	40	40
Blue-winged teal	1000	500	500	400	400	400	400	500	550	600
Cinnamon teal										
Shoveler	10	15	10	10	10	5	5	5	5	5
Wood	70	75	100	100	100	100	100	150	200	200
Redhead										
Ring-necked	350	50	20	20	20	20	30	40	40	40
Canvasback	2	2	2	2	2	2	10	10	10	10
Scaup	275	25								
Goldeneye										
Bufflehead										
Ruddy		2								
Other										
Coot:	500	300	300	100	10	10	10	15	15	15

3 -1702a

Cont. ...-1

(Rev. March 1953)

WATERFOWL (Continuation Sheet)

REFUGE ShartownMONTHS OF May 1TO August 31, 1971

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl days use	(4) Production : Broods: Estimat : seen : total	
	11	12	13	14	15	16	17	18			
Swans:											
Whistling											
Trumpeter											
Geese:											
Canada									315	3	15
Cackling											
Brant											
White-fronted									21		
Snow									42		
Blue									815		
Other											
Ducks:											
Mallard	400	400	400	400	400	400	500	500	45,850	5	150
Black						2	2		28		
Gadwall											
Baldpate											
Pintail											
Green-winged teal	40	40	40	40	40	40	40	40	4,270		20
Blue-winged teal	600	600	600	600	600	800	1000	1500	80,850	12	300
Cinnamon teal											
Shoveler											
Wood	200	200	200	200	300	350	350	400	23,765	8	100
Redhead											
Ring-necked	40	40	40	40	40	40	40	40	6,720	4	25
Canvasback	10	10	10	10	10	10	10	10	854	1	8
Scaup											
Goldeneye											
Bufflehead											
Ruddy											
Other											
Coot:	15	15	15	15	15	30	300	300	4,760	2	5

(over)

	(5)	(6)	(7)
	Total Days Use	Peak Number	Total Production
Swans			
Geese	993	25	15
Ducks	162,367	2,490	603
Coots	4,760	500	5

SUMMARY

Principal feeding areas Orrock Lake, Rice Lake, Duck Lake,

Bergerson Slough

Principal nesting areas Turnbull Slough, County Road # 5

marshes

Reported by Robert L. Briscalin

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

W A T R F O W L

REFUGE Sherburne NWR

MONTHS OF Sept. 1 TO Nov. 9, 19 71

(1) Species	(2) Weeks of reporting period									
	Sept 1-7: 8-14 1 2	15-21 3	22-28 4	29-Oct. 3 6-12 5 6	13-19 7	20-26 8	27-Nov 2:3 9	10 9		
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada	25	30	30	60	100	125	90	75	75	50
Cackling										
Brant										
White-fronted										
Snow				15	15	80				
Blue										
Other										
Ducks:										
Mallard	600	800	2500	3500	4000	5000	5000	4000	750	400
Black						2	5	5	10	
Gadwall						20	24	50	50	
Baldpate	75	100	200	200	300	200	150	100		
Pintail		50	50	150	150	200	150	100		
Green-winged teal		100	300	50				25	25	
Blue-winged teal	1500	2500	3000	2000	1000	200	100			
Cinnamon teal					2					
Shoveler					2					
Wood	400	450	500	500	500	500	500	400	25	
Redhead										
Ring-necked		10	20	50	100	1000	1200	1500	1000	
Canvasback									6	
Scaup								10		
Goldeneye										4
Bufflehead								2		
Ruddy								10		
Other					2					
Coot:	2000	5000	15000	10000	9000	5000	4500	4500	900	

3 -1760a

Cont. A-1

(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Sherburne NWRMONTHS OF Nov. 10 TO Dec. 31, 19 71

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl days use	(4) Production Broods:Estimate seen : total	
	Nov. 10-16	17-23	24-30	Dec 1-7	8-14	15-21	22-28	29-31			
Swans:											
Whistling									441		
Trumpeter											
Geese:											
Canada	100	50	25						6731		
Cackling											
Brant									87		
White-fronted									859		
Snow									679		
Blue											
Other											
Ducks:											
Mallard	300	300	50	5		10	10		273,733		
Black									196		
Gadwall									1108		
Baldpate									10761		
Pintail									23915		
Green-winged teal									8715		
Blue-winged teal									164,055		
Cinnamon teal											
Shoveler									842		
Wood			3				1	1	44545		
Redhead									40		
Ring-necked									57760		
Canvasback									1302		
Scaup									49840		
Goldeneye						3			279		
Bufflehead									430		
Ruddy									70		
Other									162		
Coot:									396,621		

(over)

	(5)	(6)	(7)
	Total Days Use	Peak Number	Total Production
Swans	441	190	-
Geese	10,845	250	15
Ducks	637,753	20,300	603
Coots	396,621	15,000	5

SUMMARY	
Principal feeding areas	Rice Lake, Orrock Lake
Principal nesting areas	Turnbull Slough, marshes along County Road # 5
Reported by	Robert L. Drieslain

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

3-1751
Form NR-1/
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge.....Sherburne..... Months of January 1 to April 30 1971

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. <u>Water and Marsh Birds:</u>										
Great blue heron	1	3/29			Resident					30
American coot	1	3/31	750	4/20	Resident					1000
Common egret	1	4/10			1	4/30				5
Sandhill crane	4	4/11	4	4/11	4	4/11				6
Common loon	3	4/13	7	4/30	Resident					20
Black crowned night heron	1	4/16			1	4/16				10
Sora	1	4/24			Resident					200
American bittern	1	4/25			Resident					200
II. <u>Shorebirds, Gulls and Terns:</u>										
Killdeer	1	3/29			Resident					
Herring gull	3	4/6			1	4/15				
Common snipe	1	4/11			Resident					
Greater yellowlegs	25	4/25								
Woodcock	1	4/25			Resident					
Common tern	1	4/30								

(over)

(1)	(2)		(3)		(4)	(5)		(6)
III. <u>Doves and Pigeons:</u>								
Mourning dove	7	1/18	1500	4/25	Resident			
White-winged dove								
IV. <u>Predaceous Birds:</u>								
Golden eagle	1	3/8						2
Duck hawk								
Horned owl		Permanent Resident				15	30	40
Magpie								
Raven								
Crow		Permanent Resident						
Bald eagle	1	2/14						3
Sparrow hawk	1	3/14	90	4/3				
Redtailed hawk	1	3/21	20	4/4				
Rough-legged hawk	1	3/25	20	3/30				
Marsh hawk	2	3/30	10	4/8				
Turkey vulture	1	4/18						
Broadwinged hawk	1	4/22						
Cooper's hawk	1	4/24						
					Reported by <u>Robert L. Dricklein</u>			

INSTRUCTIONS

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
 II. Shorebirds, Gulls and Terns (Charadriiformes)
 III. Doves and Pigeons (Columbiformes)
 IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Local: Estimated total number of the species using the refuge during the period concerned.

3-1751
Form NR-1.
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Sherburne

Months of May 1 to August 31 1971

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. <u>Water and Marsh Birds:</u>										
Green heron	5	3/8	100	7/10						125
Least bittern	1	6/9	Only Observation							
Virginia rail	1	8/25			1	8/31				25
Common loon			8	6/10	1	8/21		2	3	10
Great blue heron			24	8/29						50
Common egret			4	5/9	1	8/29				10
American bittern					1	8/30				75
Sandhill crane					2	8/2				6
II. <u>Shorebirds, Gulls and Terns:</u>										
Wilson's phalarope	1	5/2								5
Spotted sandpiper	3	5/11	50	7/10						75
Black tern	1	5/13	500	7/10						1000
Hudsonian godwit	1	5/14	Only Observation							1
Lesser yellowlegs	6	5/26								50
Upland plover	2	6/11	Only observation							2
Solitary sandpiper	1	8/19								20
Semipalmated sandpiper	6	9/2								20
Pectoral sandpiper	25	9/2								100
Greater yellowlegs			200	8/31						500
Common tern			5	6/10		6/10				10

(over)

(1)	(2)		(3)		(4)		(5)		(6)
III. <u>Doves and Pigeons:</u>									
Mourning dove	Resident						500	500	2500
White-winged dove									
IV. <u>Predaceous Birds:</u>									
Golden eagle									
Duck hawk	1	5/1			1	8/11			2
Horned owl		Permanent resident							
Magpie									
Raven									
Crow		Permanent resident							300
Osprey	1	8/29	1	8/29	1	8/31			1
Long-eared owl	3	7/1			5	7/10	1	3	10
Sharpshinned hawk	4	9/12		9/12					20
Reported by Robert L. Brieslein									

INSTRUCTIONS

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned.

3-1751
Form NR-1
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge.....Sherburne..... Months of January 1 to December 31 1957

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. <u>Water and Marsh Birds:</u>										
Great blue heron	1	3/29	30	9/23	1	10/25				50
American coot	1	3/31	15,000	9/20	1	11/6		2	10	20,000
Common egret	1	4/10	4	5/9	1	9/23				10
Common loon	3	4/13	8	6/10	1	8/21				20
Bl. crowned night heron	1	4/16	only observation							4
Sandhill crane	4	4/11			2	8/2				4
American bittern	1	4/25	100	7/20	1	8/30			50	150
Sora	1	4/24	300	9/6	1	9/11			50	500
Green heron	5	5/8	100	7/10	2	9/15			50	150
Least bittern	1	6/9	only observation							10
Virginia rail	1	8/25	50	9/6	1	9/11			25	75
II. <u>Shorebirds, Gulls and Terns:</u>										
Killdeer	1	3/29	500	7/10	7	10/23			300	750
Herring gull	3	4/6	15	8/31	2	11/11				25
Common snipe	1	4/11	100	9/5	1	10/28			20	300
Greater yellowlegs	25	4/25	200	8/31	1	10/6				250
Woodcock	1	4/25	unknown		1	10/3				10
Common tern	1	4/30	5	6/10						5
Wilson's phalarope	1	5/2	only observation							75
Spotted sandpiper	3	5/11	50	7/10	1	9/10				650
Black tern	1	5/13	500	7/10	5	9/11				250
Hudsonian godwit	1	5/14	only observation							
Lesser yellowlegs	6	5/26	200	8/31	1	9/11				
Upland plover	2	6/11	only observation							
Solitary sandpiper	1	8/19	only observation							
Semipalmated sandpiper	6	9/2	only observation							

(over)

Pectoral Sandpiper Least Sandpiper	25 200	9/2 9/2	Only observation 10	9/11	50 250
(1)	(2)	(3)	(4)	(5)	(6)
III. <u>Doves and Pigeons</u> :					
Mourning dove	7	1/18	1500	7/15	1
White-winged dove				12/24	2000
IV. <u>Predaceous Birds</u> :					
Golden eagle	1	3/8			1
Duck hawk	1	5/11		1	3
Horned owl	Permanent resident			8/11	50
Magpie					
Raven					
Crow	Permanent resident				300
Bald eagle	1	2/14	4	9/29	15
Sparrow hawk	1	3/14	100	7/20	300
Redtail hawk	1	3/21	200	7/1	400
Rough-legged hawk	1	3/25		3	150
Marsh hawk	2	3/30	10	4/8	30
Turkey vulture	1	4/18	4	9/26	6
Broadwinged hawk	1	4/22	resident	1	100
Coopers hawk	1	4/24	2	9/29	30
Long-eared owl	5	7/1	only observation	Reported by	20
Osprey	1	8/29		1	100
Sharpshinned hawk	1	9/12		10/23	
Snowy owl	1	11/23			

INSTRUCTIONS

Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)

II. Shorebirds, Gulls and Terns (Charadriiformes)

III. Doves and Pigeons (Columbiformes)

IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species during the refuge during the period concerned.

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Sherburne

For 12-month period ending August 31, 1971

Reported by Robert Driscoll

Title Assistant Refuge Manager

(1) Area or Unit Designation	(2) Habitat			(3) Use-days	(4) Breeding Population	(5) Production
	Type	Acreage				
1	Crops	2186	Ducks	185,500	320	240
	Upland	4361	Geese	1,640		
	Marsh	3374	Swans	350		
	Water		Coots	20,000		
	Total	9941	Total	207,490	320	240
2	Crops	835	Ducks	46,374	100	75
	Upland	1253	Geese		4	
	Marsh	1096	Swans			
	Water	18	Coots	10,000		
	Total	3202	Total	56,374	104	75
3	Crops	707	Ducks	80,000	150	120
	Upland	3069	Geese	1,640	8	4
	Marsh	2183	Swans			
	Water	216	Coots	300,000	10	5
	Total	6175	Total	381,640	168	131
4	Crops	984	Ducks	125,000	125	100
	Upland	2104	Geese	1,630	12	11
	Marsh	1447	Swans	136		
	Water	250	Coots	285,000		
	Total	4785	Total	411,766	137	111
5	Crops	557	Ducks	20000	75	50
	Upland	1436	Geese		4	
	Marsh	453	Swans			
	Water		Coots	12,500		
	Total	2476	Total	32,500	79	50
6	Crops	554	Ducks	6,860	30	18
	Upland	2543	Geese		2	
	Marsh	1215	Swans			
	Water	12	Coots			
	Total	4324	Total	6,860	32	18
Total	Crops	5823	Ducks	463,740	800	603
	Upland	14766	Geese	4,910	30	15
	Marsh	9795	Swans	466		
	Water	436	Coots	627,471	10	5
	Total	30900	Total	1,095,607	840	623

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

- (1) **Area or Unit:** A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.
- (2) **Habitat:** Crops include all cultivated croplands such as cereals and green forage, planted feed patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type feeds; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.
- (3) **Use-days:** Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.
- (4) **Breeding Population:** An estimate of the total breeding population of each category of birds for each area or unit.
- (5) **Production:** Estimated total number of young raised to flight age.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Starbuck

Months of January 1 to April 30, 1971

(1) Species	(2) Density	(3) Young Produced				(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres Per Bird	Number broods observed	Estimated Total	Percentage	Hunting	For Re- stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.	
Ruffed Grouse	Upland & Bottomland timber shrub swamp 9,115 acres	10			50:50				1,000		
Ring-necked pheasant	Grassland, reverting agricultural land, marsh borders & fields 8,280 acres				50:50				25		

INST. JTIONS

Form NR-2 - UPLAND GAME BIRDS*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

*Only columns applicable to the period covered should be used.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Sherburne

Months of May 1 to August 31, 1971

(1) Species	(2) Density	(3) Young Produced			(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
		Acres Per Bird	Number broods observed	Estimated Total		Hunting	For Re- stocking	For Research		
Common Name	Cover types, total acreage of habitat				Percentage				Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ruffed grouse	Upland & bottomland timber shrub swamp 9,115 acres	5	8	1000	50:50				2,000	
Ring-necked pheasant	Grassland, reverting agricultural land marsh borders & fields 3,210 acres		1	10	50:50				30	

*Only columns applicable to the period covered should be used.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

*Only columns applicable to the period covered should be used.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Sherburne

Months of Sept. 1 to December 31, 19 72

(1) Species	(2) Density	(3) Young Produced			(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
		Acres Per Bird	Number broods observed	Estimated Total		Hunting	For Re- stocking	For Research		
Common Name	Cover types, total acreage of habitat				Percentage				Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ruffed grouse	Upland & Bottomland timber, shrub swamp 9,115 acres	10			50;50	500			1000	
Ring-necked pheasant	Grassland, meadows, croplands, marsh borders 8,280 acres	165			unk				50	

*Only columns applicable to the period covered should be used.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

*Only columns applicable to the period covered should be used.

3-1757

Form 3-3
(June 1945)

BIG GAME

Refuge SherburneCalendar Year 1971

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions	(7) Estimated Total Refuge Population		(8) Sex Ratio
			Hunting	For Re- stocking	Sold	For Research	Predation	Disease	Winter Loss		At period of Greatest use	As of Dec. 31	
Common Name	Cover types, total Acreage of Habitat	Number								Number Source			
White-tailed deer	Cropland 5,822 Upland 14,787 Marsh 9,797	U					1		3		250	250	U

Remarks:

Reported by Robert L. Drialein

INSTRUCTIONS

Form NR-3 - BIG GAME

- (1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.
- (2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated total number of young produced on refuge.
- (4) REMOVALS: Indicate total number in each category removed during the year.
- (5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.
- (6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.
- (7) TOTAL REFUGE POPULATION: Give the estimated population of each species on the refuge at period of its greatest abundance and also as of Dec. 31.
- (8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

3-1754
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge Sherburne

Year ending April 30, 1971

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs					(5) Total Popula- tion	
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re- stocking	For Re- search	Share Trapping			Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	
								Permit Number	Trappers Share	Refuge share				
Muskrat	Marsh,river	4,638												750
Mink	Marsh,river	11,358												150
Beaver	Marsh,river	3,008												50
Raccoon	Marsh,river	19,368												300
Cottontail	Fields & meadows													
	8,136	325												25
White-tailed jackrabbit	Fields & meadows													
	8,136	325												25
Gray squirrel	Hardwoods	8,575	1	600										8,000

* List removals by Predator Animal Hunter

* List removals by Predator Animal Hunter

REMARKS:

Reported by Robert L. Drieslein

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

- | (1) SPECIES: | Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.) |
|-------------------------|--|
| (2) DENSITY: | Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks. |
| (3) REMOVALS: | Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headings listed. |
| (4) DISPOSITION OF FUR: | On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprime-ness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided. |
| (5) TOTAL POPULATION: | Estimated total population of each species reported on as of April 30. |
| REMARKS: | Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested. |

DISEASE

Refuge SherburneYear 1971

Botulism

Period of outbreak None

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.) _____

Condition of vegetation and invertebrate life _____

Remarks _____

Lead Poisoning or other Disease

Kind of disease _____

Species affected _____

Number Affected Species	Actual Count	Estimated
_____	_____	_____
_____	_____	_____
_____	_____	_____

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

-1757
Form NR-7
Rev. June 1960)

NONAGRICULTURAL COLLECTION RECEIPTS, AND PLANTINGS

Refuge Sherburne

(1)
Year 19 71

Collections and Receipts (Seeds, rootstocks, trees, shrubs)							Plantings (Marsh - Aquatic - Upland)						
Species	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
Big bluestem	50	R	3-71	commercial	120	100	8 locations throughout Refuge	7 lb/A mixture		93	June	good	
Indiangrass	150	R	3-71	"	210	100							
Green needle grass	150	R	3-71	" "	112	75							
Blue grama	50	R	3-71	" "	88	75							
Little bluestem	50	R	3-71	" "	128	100							
Crown vetch	60	R	3-71	" "	201	30							
Switch grass	50	R	3-71	" "	38	10							
Prairie sandreed	50	R	3-71	" "	325	30							

- (1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:

Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches _____
Forest plantings _____

Remarks: _____

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Sherburne

County Sherburne

State Minnesota

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water- fowl Browsing Crops Type and Kind	Total Acreage
	Acres	Bu./Tons	Harvested		Unharvested				
			Acres	Bu./Tons	Acres	Bu./Tons			
Corn	537	21,500 Bu	15	700 Bu	164	6560 bu	716	cover	76
Rye (harvested)	298	5,960 Bu				400 T	298	sweet clover	76
Rye (seeded)					266	266 T	266	sweet clover-wheatgrass	157
Red Clover (Seeded)					147	70 T	147	green manure	
Milo					7	0 (Froze)	37	red clover	90
Oats	39	600 bu.					39	browse	
								rye	564
								red clover	147
								Fallow Ag. Land	233

No. of Permittees: Agricultural Operations 10 Haying Operations 4 Grazing Operations 1

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
Alfalfa	160	80	80.00	1. Cattle	6-Intermittent		\$10.00	4
Red clover	150	75	-	2. Other				
				1. Total Refuge Acreage Under Cultivation				1625
Hay - Wild				2. Acreage Cultivated as Service Operation				115

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

REFUGE GRAIN REPORT

Refuge Sherburne

Months of January through December, 1957

(1) VARIETY*	(2) ON HAND BEGINNING OF PERIOD	(3) RECEIVED DURING PERIOD	(4) TOTAL	(5) GRAIN DISPOSED OF				(6) ON HAND END OF PERIOD	(7) PROPOSED OR SUITABLE USE*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Yellow corn	500	700	1200			900	900	300		300	
Proso millet	50	0	50			50	50	0			
Foxtail millet	30	0	20			20	20	10		10	

(8) Indicate shipping or collection points Princeton, Minnesota

(9) Grain is stored at Refuge granary

(10) Remarks _____

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

- (1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR-9.
- (3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.
- (4) A total of columns 2 and 3.
- (6) Column 4 less column 5.
- (7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.
- (8) Nearest railroad station for shipping and receiving.
- (9) Where stored on refuge: "Headquarters granary," etc.
- (10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

COLLECTIONS AND RECEIPTS OF PLANTING STOCK
(Seeds, rootstocks, trees, shrubs)

Refuge Sherburne Year 1957

Species	Collections				Receipts		Total Amounts on Hand	Amount Surplus
	Amount	Date or Period of Collection	Method	Unit Cost	Amount	Source		
sweet clover					800 lb.	commercial	0	
Alfalfa					200 lb.	commercial	0	
Slender wheatgrass					750 lb.	commercial	0	
Tall wheatgrass					750 lb.	commercial	200	0

Interior Duplicating Section,
Washington 25, D.C. 17261

TIMBER REMOVAL

Refuge **Sherburne**

Year 195**X 71**

Permittee	Permit No.	Unit or Location	Acreage	No. of Units Expressed in B. F., ties, etc.	Rate of Charge	Total Income.	Reservations and/or Diameter Limits	Species Cut
Leonard Latterell	Sher 28-71	S.3, T. 34N. R. 27 W.	10	Scotch 6'-295 Scotch 5'-144 Red Pine - 20	\$1.00EA .75EA .75EA	\$295 108 15	Clear cut Scotch Red pine cut to 9'X9' Spacing	Scotch Pine Red Pine

Total acreage cut over **10**

Total income **\$418.00**

No. of units removed B. F. _____

Method of slash disposal **No Slash**

Cords _____

Ties _____

Xmas Trees 459

ANNUAL REPORT OF PERSTICIDE APPLICATION

Proposal Number

Reporting Year

1971

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
May-June	Quack grass	all farm units	700	Aatrex	700 lb.	1 lb/A	water 25gal/A	tractor sprayer
June	Poison ivy	nature trail	5	AMS	10 lb.	2 lb/A	water 8lb/100 gal.	hand sprayer
July	Leafy spurge Canada thistle	12 areas scattered throughout Refuge	6	Picloram	3 lb.	.5 lb/A	2% granules	hand spreader
July	Pocket gophers	goose observation area	7	Strychnine	.005 lb/A	2 lb/A	.3% Bait	Barrow builder

10. Summary of results (continue on reverse side, if necessary)

Aatrex is applied by farming permittees as part of contract-provides seasonal control of quack grass in corn.

AMS gave excellent control on poison ivy.

Picloram has given very satisfactory results with both spurge and thistle-however we have many scattered spurge plants showing up on edges of treated areas-we evidently have been too conservative in the size of treatment area.

WATERFOWL

REFUGE Sherburne NWR

MONTHS OF Sept. 1 TO Nov. 9, 19 71

(1) Species	Weeks of reporting period ⁽²⁾									
	Sept 1-7	8-14	15-21	22-28	29-Oct. 5	6-12	13-19	20-26	27-Nov. 2	3-10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada	25	30	30	60	100	125	90	75	75	50
Cackling										
Brant										
White-fronted										
Snow				15	15		80			
Blue										
Other										
Ducks:										
Mallard	600	800	2500	3500	4000	5000	5000	4000	750	400
Black						2	5	5	10	
Gadwall						20	24	50	50	
Baldpate	75	100	200	200	300	200	150	100		
Pintail		50	50	150	150	200	150	100		
Green-winged teal		100	300	50				25	25	
Blue-winged teal	1500	2500	3000	2000	1000	200	100			
Cinnamon teal										
Shoveler					2					
Wood	400	450	500	500	500	500	500	400	25	
Redhead										
Ring-necked		10	20	50	100	1000	1200	1500	1000	
Canvasback									6	
Scaup								10		
Goldeneye										4
Bufflehead									2	
Ruddy								10		
Other					2					
Coot:	2000	5000	15000	10000	9000	5000	4500	4300	900	

3-1750a
 Cont. NR-1
 (Rev. March 1953)

WATERFOWL
 (Continuation Sheet)

REFUGE Sherburne NWR

MONTHS OF Nov. 10 TO Dec. 31, 19 71

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl days use	(4) Production : Broods: Estimated : seen : total	
	Nov. 10-16	17-23	24-30	Dec 1-7	8-14	15-21	22-28	29-31			
	11	12	13	14	15	16	17	18			
Swans:											
Whistling									441		
Trumpeter											
Geese:											
Canada	100	50	25						6731		
Cackling											
Brant											
White-fronted									87		
Snow									859		
Blue									679		
Other											
Ducks:											
Mallard	300	300	50	5		10	10		273,733		
Black									196		
Gadwall									1108		
Baldpate									10761		
Pintail									23915		
Green-winged teal									8715		
Blue-winged teal									164,055		
Cinnamon teal											
Shoveler									842		
Wood									44545		
Redhead			3				1	1	40		
Ring-necked									57760		
Canvasback									1302		
Scaup									49840		
Goldeneye							3		279		
Bufflehead									430		
Ruddy									70		
Other									162		
Coot:									396,621		

(over)

	(5)	(6)	(7)	
	Total Days Use	Peak Number	Total Production	SUMMARY
Swans	441	190	-	Principal feeding areas <u>Rice Lake, Orrock Lake</u>
Geese	10,845	250	15	
Ducks	637,753	20,300	603	Principal nesting areas <u>Turnbull Slough, marshes along</u>
Coots	396,621	15,000	5	<u>County Road # 5</u>
				Reported by <u>Robert L. Drieslein</u>

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

3-1751

Form NR-1A

(Nov. 1945)

MIGRATORY BIRDS

(other than waterfowl)

Refuge SherburneMonths of January 1 to December 31 1947

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. <u>Water and Marsh Birds:</u>										
Great blue heron	1	3/29	30	9/23	1	10/25				50
American coot	1	3/31	15,000	9/20	1	11/6		2	10	20,000
Common egret	1	4/10	4	5/9	1	9/23				10
Common loon	3	4/13	8	6/10	1	8/21				20
Bl. crowned night heron	1	4/16	only observation							4
Sandhill crane	4	4/11			2	8/2				4
American bittern	1	4/25	100	7/20	1	8/30			50	150
Sora	1	4/24	300	9/6	1	9/11			50	500
Green heron	5	5/8	100	7/10	2	9/15			50	150
Least bittern	1	6/9	only observation							10
Virginia rail	1	8/25	50	9/6	1	9/11			25	75
II. <u>Shorebirds, Gulls and Terns:</u>										
Killdeer	1	3/29	500	7/10	7	10/23			300	750
Herring gull	3	4/6	15	8/31	2	11/11				25
Common snipe	1	4/11	100	9/5	1	10/28			20	300
Greater yellowlegs	25	4/25	200	8/31	1	10/6				250
Woodcock	1	4/25	unknown		1	10/3				10
Common tern	1	4/30	5	6/10						
Wilson's phalarope	1	5/2	only observation							5
Spotted sandpiper	3	5/11	50	7/10	1	9/10				75
Black tern	1	5/13	500	7/10	5	9/11				650
Hudsonian godwit	1	5/14	only observation							
Lesser yellowlegs	6	5/26	200	8/31	1	9/11				250
Upland plover	2	6/11	only observation							
Solitary sandpiper	1	8/19	only observation							
Semipalmated sandpiper	6	9/2	only observation							

(over)

Pectoral Sandpiper	25	9/2	Only observation		9/11				50
Least Sandpiper	200	9/2	10						250
(1)	(2)	(3)	(4)	(5)	(6)				
III. <u>Doves and Pigeons:</u>									
Mourning dove	7	1/18	1500	7/15	1	12/24			2000
White-winged dove									
IV. <u>Predaceous Birds:</u>									
Golden eagle	1	3/8							1
Duck hawk	1	5/11			1	8/11			3
Horned owl	Permanent resident								50
Magpie									
Raven									
Crow	Permanent resident								300
Bald eagle	1	2/14	4	9/29	1	12/12			15
Sparrow hawk	1	3/14	100	7/20	1	12/19	50		300
Redtail hawk	1	3/21	200	7/1	3	11/2			400
Rough-legged hawk	1	3/25			3	12/19			150
Marsh hawk	2	3/30	10	4/8	1	11/ 8			30
Turkey vulture	1	4/18	4	9/26	4	9/26			6
Broadwinged hawk	1	4/22	resident		1	10/6			100
Coopers hawk	1	4/24	2	9/29		9/29			30
Long-eared owl	5	7/1	only observation			Reported by.....			20
Osprey	1	8/29			1	10/2			1
Sharpshinned hawk	4	9/12			1	10/23			100
Snowy owl	1	11/23							

INSTRUCTIONS

Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
 II. Shorebirds, Gulls and Terns (Charadriiformes)
 III. Doves and Pigeons (Columbiformes)
 IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Sherburne

Months of Sept. 1 to December 31, 19 72

(1) Species	(2) Density	(3) Young Produced			(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
		Acres Per Bird	Number broods observed	Estimated Total		Hunting	For Re- stocking	For Research		
Common Name	Cover types, total acreage of habitat				Percentage				Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ruffed grouse	Upland & Bottomland timber, shrub swamp 9,115 acres	10			50;50	500			1000	
Ring-necked pheasant	Grassland, meadows, croplands, marsh borders 8,280 acres	165			unk				50	

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

*Only columns applicable to the period covered should be used.

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge Sherburne Calendar Year 1971

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Hunting	For Re- stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
White-tailed deer	Cropland 5,822 Upland 14,787 Marsh 9,797	U					1		3			250	250	U

Remarks:

Reported by Robert L. Drieslein

INSTRUCTIONS

Form NR-3 - BIG GAME

- (1) **SPECIES:** Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.
- (2) **DENSITY:** Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) **YOUNG PRODUCED:** Estimated total number of young produced on refuge.
- (4) **REMOVALS:** Indicate total number in each category removed during the year.
- (5) **LOSSES:** On the basis of known records or reliable estimates indicate total losses in each category during the year.
- (6) **INTRODUCTIONS:** Indicate the number and refuge or agency from which stock was secured.
- (7) **TOTAL REFUGE POPULATION:** Give the estimated population of each species on the refuge at period of its greatest abundance and also as of Dec. 31.
- (8) **SEX RATIO:** Indicate the percentage of males and females of each species as determined from field observations or through removals.

3-1754

Form NR-4

(June 1945)

SMALL MAMMALS

Refuge Sherburne

Year ending April 30, 1971

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs					(5) Total Popula- tion	
Common Name	Cover Types & Total	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re- stocking	For Re- search	Share Trapping			Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	
	Acreage of Habitat							Permit Number	Trappers Share	Refuge share				
Muskrat	Marsh,river	4,638												750
Mink	Marsh,river	11,358												150
Beaver	Marsh,river	3,008												50
Raccoon	Marsh,river	19,368												300
Cottontail	Fields & meadows													
		8,136												25
White-tailed jackrabbit	Fields & meadows													
		8,136												25
Gray squirrel	Hardwoods	8,575	1	600										8,000

* List removals by Predator Animal Hunter

* List removals by Predator Animal Hunter

REMARKS:

Reported by Robert L. Drieslein

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

- (1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)
 - (2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
 - (3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headings listed.
 - (4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprime-ness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.
 - (5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.
- REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

DISEASE

Refuge Sherburne Year 19 71

Botulism

Period of outbreak None

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.) _____

Condition of vegetation and invertebrate life _____

Remarks _____

Lead Poisoning or other Disease

Kind of disease _____

Species affected _____

Number Affected Species	Actual Count	Estimated
_____	_____	_____
_____	_____	_____
_____	_____	_____

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

-1757
Form NR-7
Rev. June 1960)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS

(1)

Refuge Sherburne

Year 19 71

Species	Collections and Receipts (Seeds, rootstocks, trees, shrubs)						Plantings (Marsh - Aquatic - Upland)						
	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
Big bluestem	50	R	3-71	commercial	120	100	8 locations throughout Refuge	7 lb/A mixture		93	June	good	
Indiangrass	150	R	3-71	" "	210	100							
Green needle grass	150	R	3-71	" "	112	75							
Blue gramma	50	R	3-71	" "	88	75							
Little bluestem	50	R	3-71	" "	128	100							
Crown vetch	60	R	3-71	" "	201	30							
Switch grass	50	R	3-71	" "	38	10							
Prairie sandreed	50	R	3-71	" "	325	30							

- (1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:

Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches _____
Forest plantings _____

Remarks: _____

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Sherburne County Sherburne State Minnesota

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water- fowl Browsing Crops Type and Kind	Total Acreage
	Acres	Bu./Tons	Harvested		Unharvested				
			Acres	Bu./Tons	Acres	Bu./Tons			
Corn	537	21,500 Bu	15	700 Bu	164	6560 bu	716	cover	76
Rye (harvested)	298	5,960 Bu				400 T	298	sweet clover	76
Rye (seeded)					266	266 T	266	sweet clover-wheatgrass green manure	157
Red Clover(Seeded)					147	70 T	147	red clover	90
Milo					7	0(Froze)	7	browse	
Oats	39	600 bu.					39	rye red clover	564 147
								Fallow Ag. Land	233

No. of Permittees: Agricultural Operations 10 Haying Operations 4 Grazing Operations 1

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
Alfalfa	160	80	80.00	1. Cattle	6-Intermittent		\$10.00	4
Red clover	150	75	-	2. Other				
				1. Total Refuge Acreage Under Cultivation				1625
Hay - Wild				2. Acreage Cultivated as Service Operation				115

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

REFUGEE GRAIN REPORT

Refuge Sherburne

Months of January through December, 1972

[illegible]

(8) Indicate shipping or collection points Princeton, Minnesota

(9) Grain is stored at Refuge granary

(10) Remarks _____

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

- (1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR-9.
- (3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.
- (4) A total of columns 2 and 3.
- (6) Column 4 less column 5.
- (7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.
- (8) Nearest railroad station for shipping and receiving.
- (9) Where stored on refuge: "Headquarters granary," etc.
- (10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

3-1759
Form NR-9
(April 1946)

COLLECTIONS AND RECEIPTS OF PLANTING STOCK
(Seeds, rootstocks, trees, shrubs)

Refuge Sherburne Year 1951

Species	Collections				Receipts		Total Amounts on Hand	Amount Surplus
	Amount	Date or Period of Collection	Method	Unit Cost	Amount	Source		
sweet clover					800 lb.	commercial	0	
Alfalfa					200 lb.	commercial	0	
Slender wheatgrass					750 lb.	commercial	0	
Tall wheatgrass					750 lb.	commercial	200	0

3-1761
Form NR-11
(2/46)

TIMBER REMOVAL

Refuge..... Sherburne

Year 19~~7~~71

Permittee	Permit No.	Unit or Location	Acreage	No. of Units Expressed in B. F., ties, etc.	Rate of Charge	Total Income	Reservations and/or Diameter Limits	Species Cut
Leonard Latterell	Sher 28-71	S.3,T. 34N. R. 27 W.	10	Scotch 6'-295 Scotch 5'-144 Red Pine - 20	\$1.00EA .75EA .75EA	\$295 108 15	Clear cut Scotch Red pine cut to 9'X9' Spacing	Scotch Pine Red Pine

Total acreage cut over.....10

Total income.\$418.00

No. of units removed B. F.
Cords.....

Method of slash disposal..... No Slash

Ties.....

Xmas Trees459